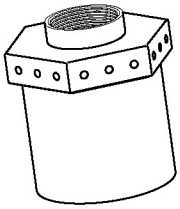
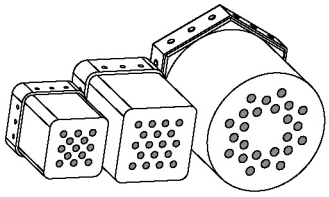
Joppa Glassworks, Inc.

Product Catalog
Dec. 2024



Giberson Patented
Ceramic Burners



The Studio Workshop of
Dudley Giberson
Warner, New Hampshire

- Gas Burners for Furnaces, Glories, Forges & Foundries
- Electric Heating Elements for Annealers and Slumpers
- Kiln Controllers (Digital Temperature Control)
- Dudley's Treatise on How to Build Glass Making Equipment, ***A Glassblower's Companion***

Joppa Glassworks, Inc.
2024 Product Catalog

Written and Illustrated by Dudley F. Giberson, Jr.

Dudley F. Giberson, Jr., President
Joppa Glassworks, Inc.

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Warner, N.H. 03278

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P.O. Box 202
Warner, N.H. 03278
Phone 603-456-3569

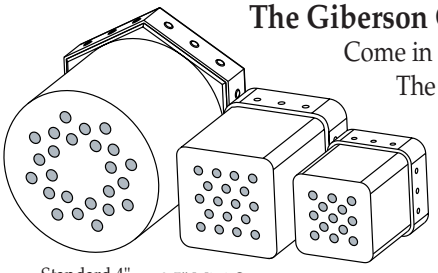
e-mail: <joppaglass@conknet.com>

Be sure to visit our hot-link to the world
www.joppaglass.com

Table of Contents

The Giberson Ceramic Burner Heads

Come in Three Basic Shapes:
The Hex-Backed 4" Round (6 Models)
The 2.5" Mini-Square (18 Holes x 7/32")
The 2" Mini-Square (13 Holes x 7/32")



Standard 4" Giberson Ceramic Head $195.00

2.5" Mini-Square Giberson Head $145.00

2" Mini-Square Giberson Head $125.00

If you would like help making sense of the many choices, please call Dudley 603-456-3569 for a free consultation.

Suggested Uses for the Giberson Ceramic Burner Heads:

- **Glassmaking**
  - Glass Melting Pot Furnaces
  - Glass Melting Day Tanks
  - Glory Holes
  - Gas Annealing Ovens
- **Pottery Kilns**
  - Salt Kilns
  - High Temperature Ceramic Kilns
- **Foundry Furnaces**
- **Blacksmith Forge**s & Other Heating Devices

	Model	Orifice for HP Propane	**Venturi Mix** Btu Range (1000s) HP Propane	**Forced Air** Btu Range (1000s) Nat. Gas	Various Uses	No. of Holes	Hole Size
New Mini-Square	SQ 2 7/32	72	10-34	10-40	for small foundry furnaces and glass furnaces (5 lb) small 4-5" glories	13	7/32"
	SQ 2.5 7/32	69	13-47	13-52	for small foundry furnaces and glass furnaces (10 lb) small 5-6" glories, small pottery kilns.	18	7/32"
Traditional Giberson Round Burners	B-3/16	65	30-68	30-75	for small glories and furnaces (25 to 35 lbs.), pipe warmers, bead furnaces, & gas annealing kilns	24	3/16"
	B-7/32	60	39-88	39-95	pot furnaces & various multiple burner applications	24	7/32"
	B-250S	59	41-93	41-99	small to medium glories (1 cubic foot, with 8" door), medium pot furnaces, etc.	24	1/4"
	B-250	58	44-98	44-120	day tank furnaces (100 lbs.), invested pot furnaces (150 lbs), glories (9" to 11"), freestanding pot furnaces (200 lbs.)	24	17/64"
	B-255	57	46-103	46-150	day tank furnaces (200 lbs.) & medium glories (11" to 15")	24	9/32"
	B-650	56	54-120	54-195	large glories (16" to 18"), day tank furnaces (to 300 lbs.), salt kilns, & forges	24 Plus one lg. ctr. hole	9/32" 5/8"

The Proper Installation of the Giberson Head and the best burner port design to match the Giberson Head

Here follows several design ideas about how to get good life out of your Giberson Ceramic Burner Head. Two to three years is the average life, but I have a Giberson tip in my glory hole which is 25 years old and many people have burners that typically last ten years, outlasting several furnaces or glories!

Please note that I promise only two things. First, the burner you buy today was personally cast by me. By this I mean I make them with my own hands, the same as I did 35 years ago. And second, sooner or later the head will break. Some people will drop it and break it on opening the package. Others have broken them by hammering on the pipe work, brand new. (Don't do that!) Still others get burner "pop-back" or "burn-back" on the initial firing because they don't understand what "pop-back" is. "Pop-back" is when the flame is burning in the head, not in front of the head. And with this condition in place, they turn up the gas and ruin the head. For a page of good color graphics concerning this problem, go to http://www.joppaglass.com/burner/pop_back.html (and if this explanation is insufficient, give Dudley a call).

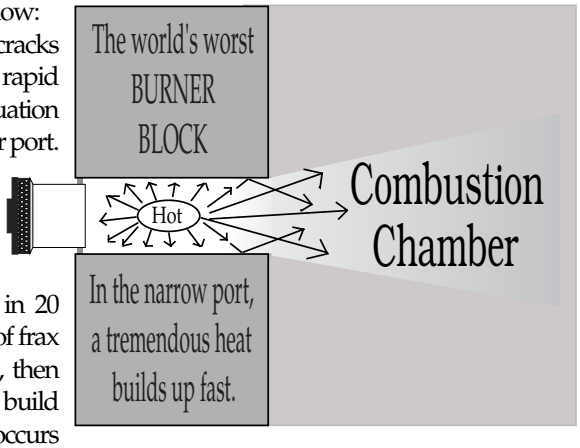
However, 95% of the installations go along with none of the hair-pulling problems just suggested. Having a trouble-free site is our primary aim. Please look over and study the following material. If you follow the suggestions offered, you will have the best chance for a trouble free studio.

If you are not sure of type of fuel (i.e., high or low pressure gas) or type of mixer to use, please visit this site which specifically addresses these issues:

<http://www.joppaglass.com/burner/choice.html>.

A WORSE CASE SCENARIO

We begin by showing the worst case scenario. This is a situation which has killed many a good Giberson head. The Giberson Ceramic Head is not made out of a super "god" material. It is subject to expansion and contraction. And just like crucibles, sooner or later the Giberson Ceramic Burner Head will crack and need replacement. But this is a sure killer– the narrow, long burner port shown below:



This straight burner port cracks heads because of the intense and rapid heat that builds up. The only situation worst than this is the "all-frax" burner port. It is general practice to turn on a glory hole and expect to be at working temperature within 30-45 minutes, maybe an hour. But an all frax glory can get to temperature in 20 minutes. If the burner port is made of frax and is long, like our example here, then we get this rapid and intense heat build up just in front of the head which occurs within a couple of minutes. **That's too hot, too fast!** And that spells "trouble!" So with this "bad" idea on the page, let's explore some other ideas that promote burner head longevity.

Checklist for a Good Burner Head Installation

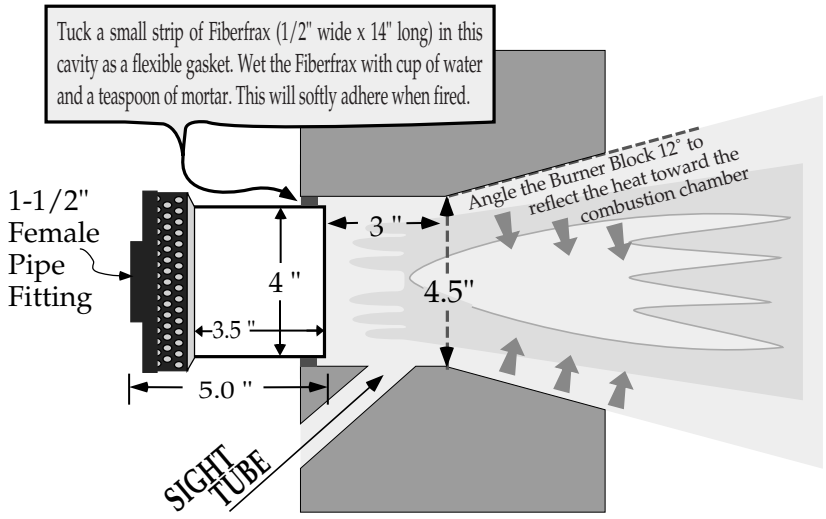
☐ 1. The burner head is 4" in diameter and the burner block (port) should be 4-1/2" in diameter. This leaves a 1/4" space on all sides of the head.

☐ 2. Place the front of the head about 1/2"- 3/4" into the burner port.

☐ 3. The burner head is designed to be sealed into the burner block (port). To seal the head into the port, I use a piece of frax that is 1/2" square X 14" long. Soak the frax strip in water and apply about one teaspoon of Sairset mortar to the frax strip. In this wet condition the frax will compress and pack in the small space between the head and burner port. This gasket will be somewhat flexible even after the mortar hardens.

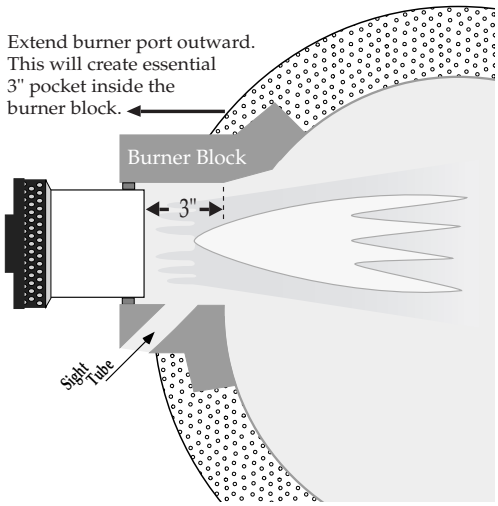
☐ 4. Do not cover the head with Fiberfrax or any insulation product. The head needs to be exposed to the cool air.

☐ 5. If the burner block combustion channel is more than 3"long in front of the burner head, angle the sides of the combustion channel to reflect the heat toward the combustion chamber.



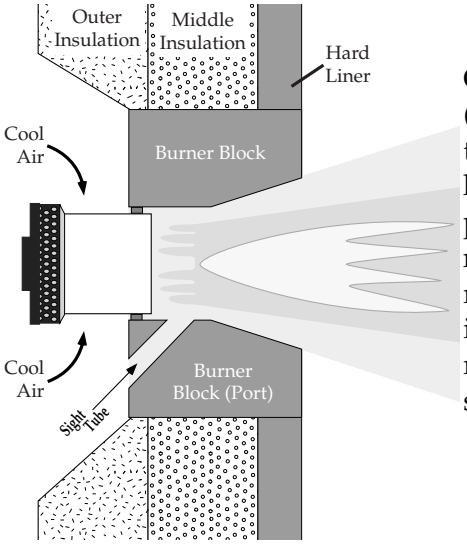
Typical Glory Hole Installation

On a narrow, thin-walled installation such as this glory hole in a barrel, the burner block can be extended outward to accommodate the necessary design elements. Here in the space in front of the burner head there is a pocket at least 3" deep to help the flame seat properly. This is also the UV sight target (about 3-4" in front of the head). The site tube should focus on this spot.



Note: For a complete explanation of how to make this type burner port, refer to pp. 44 of ***A Glassblower's Companion***.

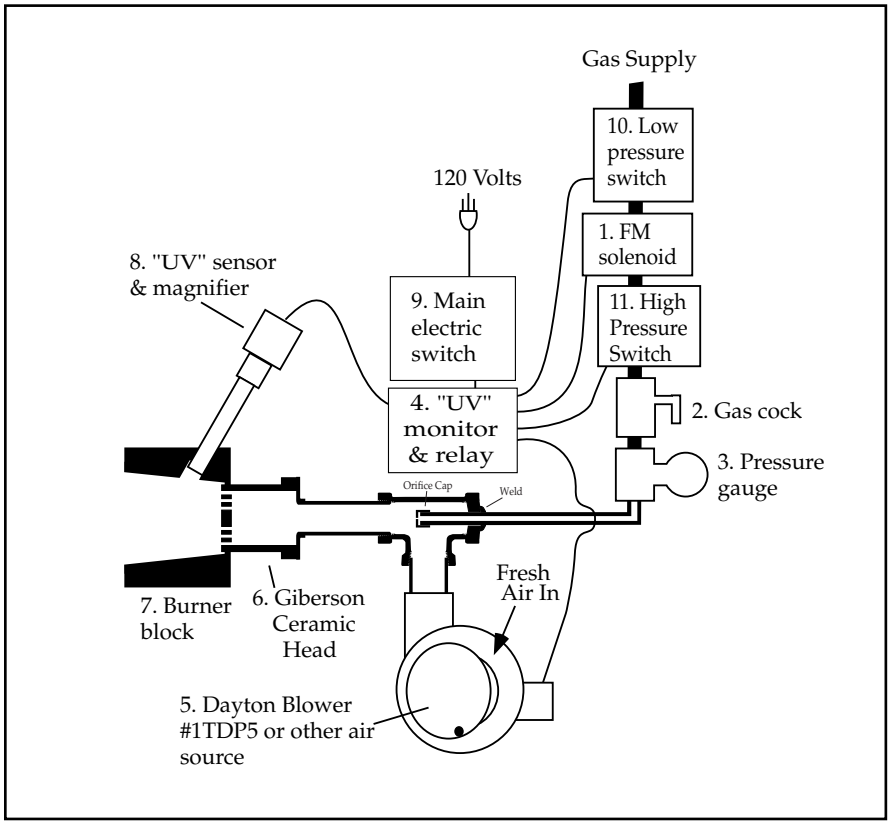
Installation of burner in thick-walled furnace



On a thick-walled furnace structure (greater than 6" thick), it is desirable to inset the burner block as shown here. This eliminates most of the problems associated with a long narrow burner port and allows a majority of the heat to move easily into the combustion chamber. It also makes the burner head less obtrusive (sticks out less).

If you have any questions please call
Dudley Giberson (603) 456-3569

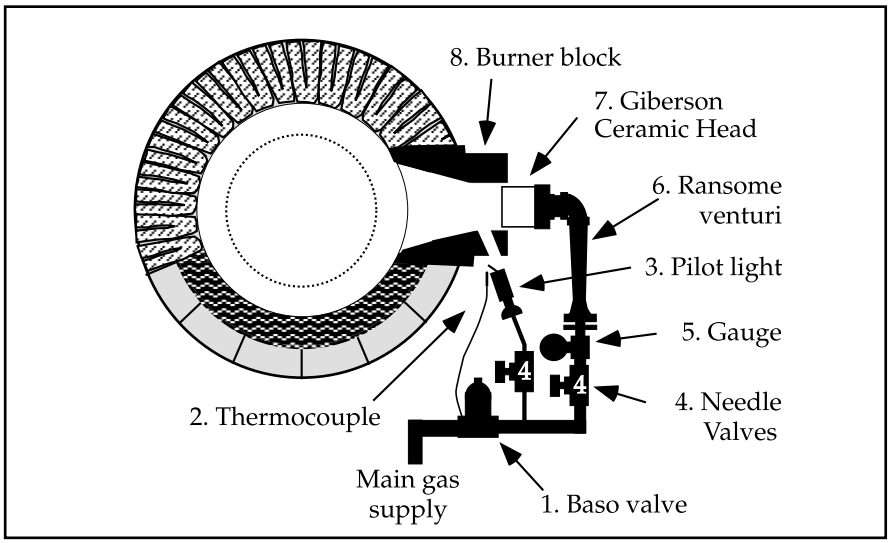
Schematic for Low Pressure Gas Safety System (Propane or Natural Gas)



#	Product Description	Vendor	Approximate Cost
1	FM solenoid (ASCO)	Use HVAC Contractor	$420.00
2	Gas cock	Use HVAC Contractor	$38.00
3	Pressure gauge (for low pressure)	Use HVAC Contractor	$78.00
4	UV monitor & relay (manual start)	Use HVAC Contractor	$787.00
5	Dayton blower #1TDP5	WW Grainger	$95.00
6	Giberson Ceramic Burner	Joppa Glassworks, Inc.	$195.00
7	Burner block	homemade	$20.00
8	UV Scanner	Use HVAC Contractor	$139.00
9	Main electric switch	local store	$15.00
10	Low limit pressure switch	Use HVAC Contractor	$130.00
11	High limit pressure switch	Use HVAC Contractor	$130.00
	Total of listed items		$2047.00

Schematic for <u>High Pressure</u> Propane Safety System

Before choosing this system, please read about the difficulties of getting this system passed by your friendly gas inspector. This subject is covered in detail at our web site: **http://www.joppa-glass.com/burner/comp_son.html** and it is discussed in *A Glassblower's Companion*, p. 120.

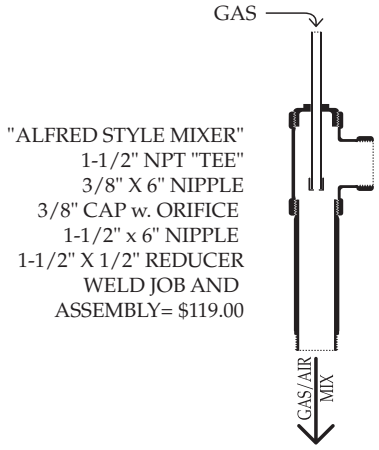


#	Product Description	Vendor	Approximate Cost
1	Baso valve (H19RA-2)	Joppa Glassworks, Inc.	$210.00
2	Thermocouple (JC-TC48)	Joppa Glass	$28.00
3	Pilot light (B1S)	Joppa Glass	$220.00
(SEE URL: http://**www.joppaglass.com/burner/pilot.html** for "how to" instructions)			
4	(2) Needle valves ($23.00 ea)	Joppa Glass	$52.00
5	Gauge (0-30 psi)	Joppa Glass	$23.00
6	Ransome Venturi 1-1/2"	Joppa Glass	$235.00
7	Giberson Ceramic Head	Joppa Glass	$195.00
8	Burner block	homemade	$25.00
	Total of listed items		$988.00

At Joppa Glass we sell the high pressure safety equipment shown on this page. Others also sell this equipment as well as the safety systems for low pressure systems shown on the opposite page (6). Here are the names of a few firms that are willing to assist you in your choices of safety equipment:

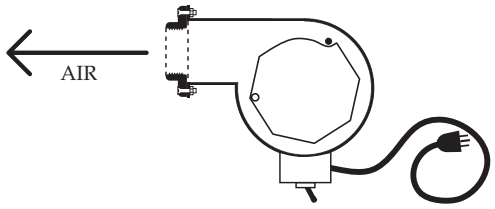
HUB, John Chiles, 690 Route 73, Orwell, Vt. 05760 (802-948-2209)
Meeder Equip/ Ransome MFG, P. O. Box 12446, Fresno, CA 93777-2446 (559-485-0979)

Alfred Style Gas/Air Mixer for Low Pressure
Natural Gas or Propane

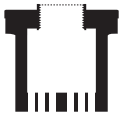


"ALFRED STYLE MIXER"
1-1/2" NPT "TEE"
3/8" X 6" NIPPLE
3/8" CAP w. ORIFICE
1-1/2" x 6" NIPPLE
1-1/2" X 1/2" REDUCER
WELD JOB AND
ASSEMBLY= $119.00

DAYTON 1TDP5 BLOWER, with
AIR BAFFLE, 1-1/2" FLANGE,
Power Cord, Switch.. $269.50



DAYTON BLOWER W BAFFLE	$269.50
ALFRED MIXER	$119.00
GIBERSON BURNER HEAD	$195.00
TOTAL FOR COMPLETE KIT	$583.50



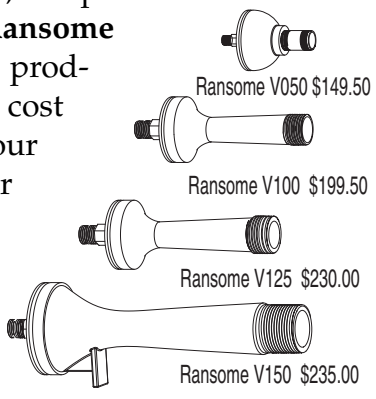
GIBERSON CERAMIC
BURNER HEADS
ALL STANDARD SIZES
$195.00 ea.

Customer provides all parts not shown, i. e., component connections as air pipe, gas gauges, ball valves, etc. Safety system not provided.

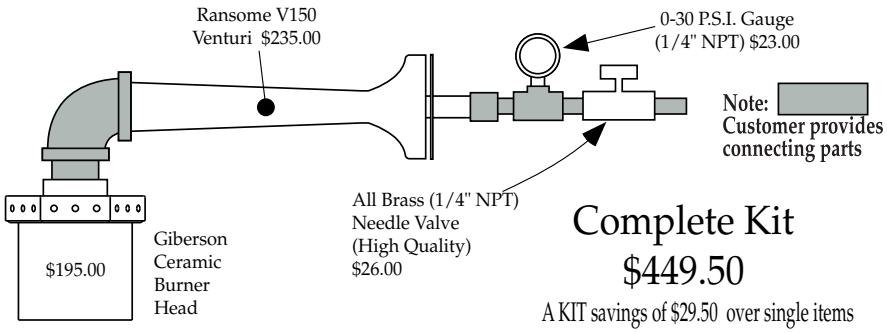
RANSOME CAST IRON VENTURIES

A SIMPLE, HIGH QUALITY PRODUCT

Over the years Joppa Glassworks, Inc., has promoted only one kind of venturi, the **Ransome Venturi**. The reason is the Ransome products are very well made, efficient, and cost effective. We offer these venturies to our customers for use with our burner heads and accessories. These venturies can be used over a wide gas pressure range with multiple gas usages. If you have questions please contact Dudley:
ph. 603-456-3569



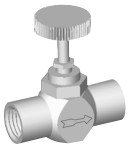
Joppa Glassworks High Pressure Propane Burner System



Complete Kit
$449.50

A KIT savings of $29.50 over single items

Our High Pressure Kit includes burner head, venturi, needle valve, and gauge.
See below for correct Head Size/Orifice Size to fit your BTU needs.



High quality needle valve, all brass construction. These are capable of making the finest of adjustments.

High Quality
1/4" NPT Brass Needle
Valve $26.00 ea.

Our standard gas pressure gauge is for High Pressure Propane. 0-30 PSI. We sell only a glass faced gauge so this will proform well (not melt) in ambient temperatures that are typical near burners. (But please keep below 200˚F)

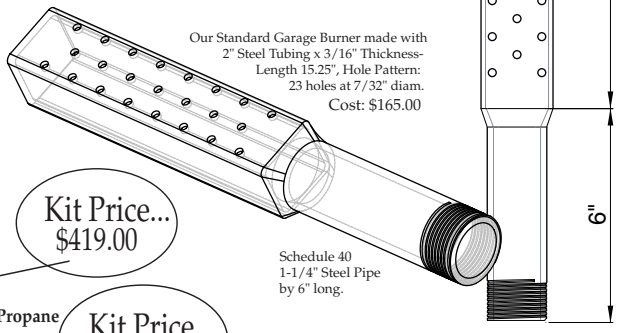
0-30 psi Gauge, 1/4" NPT
$23.00

Dudley's "Garage Burner"

It is a Beauty. Very efficient and a great steady burn. Works with all gasses.
Does not need forced air. Use with venturi #V125, or V100.
Orifices with Gas Chart:

High Pressure **Propane**	Use #60 orifice	5 psi	Use needle valve
Low Pressure **Propane**	Use #48 orifice	11" w.c.	Use Gas Cock
Low Pressure **Natural Gas**	Use #35 orifice	7" w.c.	Use Gas Cock

All Gasses: this burner runs steady from 5,000 Btu's to 41,000 Btu's



Our Standard Garage Burner made with
2" Steel Tubing x 3/16" Thickness-
Length 15.25", Hole Pattern:
23 holes at 7/32" diam.
Cost: $165.00

Buy Parts or Kits

Purchase the head only for **$165.00**

Or purchase a venturi package:

For High Pressure Propane

Garage Burner.	165.00
Ransome V125 Venturi . .	230.00
Needle Valve	26.00
Gauge	23.00
Total	$444.00

Kit Price...
$419.00

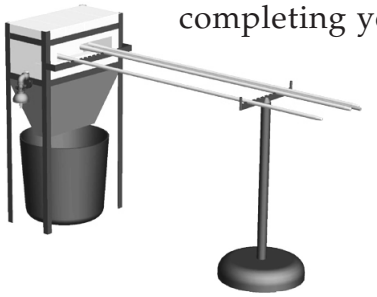
For Low Pressure Nat. Gas and Propane

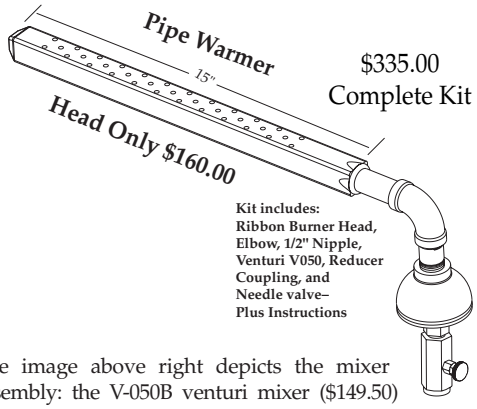
Garage Burner.	165.00
Ransome V125 Venturi . .	230.00
Needle Valve	26.00
Total	$421.00

Kit Price...
$399.00

The Joppa Glassworks Pipe Warmer

Here is our solution for a great pipe warmer. Works on either Natural Gas or Propane. Construction Kit includes complete burner as shown in diagram and instructions for completing your own Pipe Warmer.



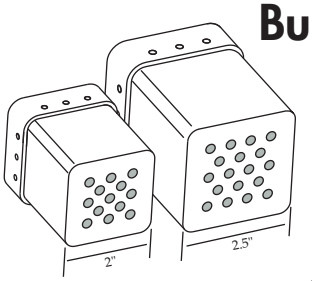


$335.00
Complete Kit

Pipe Warmer Orifice Chart		
Low Pressure Natural Gas	6" WC	#48 Orifice
Low Pressure Propane	8"-11" WC	#54 Orifice
High Pressure Propane	1-2 psi	#65 Orifice
You will not need much pressure. Use needle valve to modulate gas flow.		

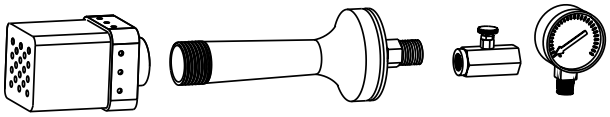
The image above right depicts the mixer assembly: the V-050B venturi mixer ($149.50) with needle valve ($26.00). Also included are the 1/2" nipple, 90 degree elbow, the reducer bushing (1/4" to 1/8") to attach needle valve to spud as shown. The overall value of these parts is $350.00. We offer these parts as a kit at a modest savings of $15.00 at the price of $335.00.

A Pair of Great Burners from Dudley's Burner Workshop...



$125.00 $145.00

The Mini-Square Burner Series: These burners are terrific for making that small glory, pot furnace or mini-forge. Great for a small foundry furnace which can burn for many hours on a small tank of propane.



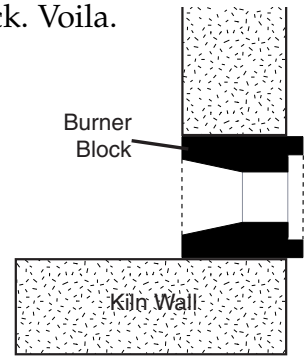
2.5" Mini-Sq. Kit=$368.00
2" Mini Sq Kit = $348.00

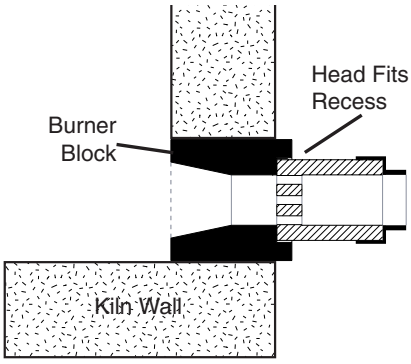
The 2-1/2" Mini Square Kit includes a #2.5" Mini-Square Giberson Burner Head, a Ransome V100 with orifice, Needle Valve, and a Gauge (0-30 psi), a total value of $393.50 You save $25.50 by purchasing as a **kit at the great price of 368.00**

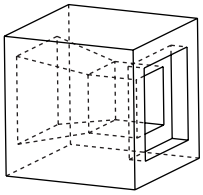
The 2" Mini-Square is also sold as a kit: Same components. Individual pieces cost $373.50, but the Kit price saves you $25.50. **Kit at the great price of $348.00**

Easy Installation of the Mini-Square Burners:

1. Set the burner block into the kiln wall.
2. Place the burner head into the recessed lip of the Burner Block. Voila.







Mini-Square Burner Blocks

We have two sizes of burner blocks:

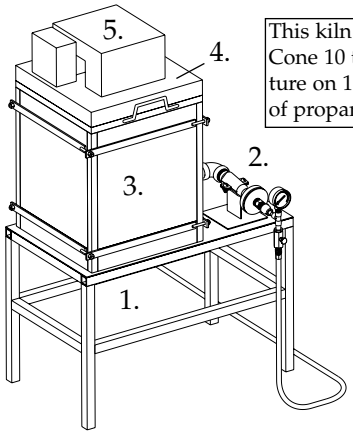
The 2″ burner block	$30.00
The 2.5″ burner block	$35.00

I have posted complete instructions on how you can make your own burner blocks. Go to our web site:
<www.joppaglass.com/burner/burner/mini_sq_gibersons/mini-squares%20v1.2.2.pdf>
Look up pages 6 to 8 for instructions for making your own Burner Blocks.

Easy to make items using the Mini-Square Burners:

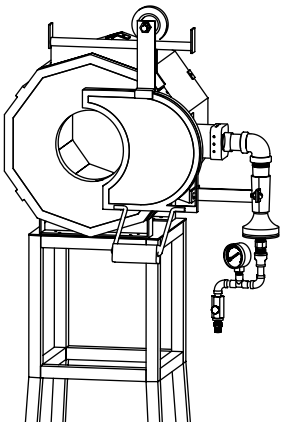
For project plans go to<www.joppaglass.com/burner/mini_square_PDF_PG.html>

Pottery Test Kiln– 2 to 3 cf
Fires to Cone 10



This kiln fires to Cone 10 temperature on 1/2 gallon of propane

Glass Blower's Mini-Glory
4″to 7″ Opening



Electric Heating Elements

For

- *ANNEALING KILNS*
- *CASTING KILNS*
- *SLUMPING KILNS*
- *POTTERY KILNS*
- *BIT BOXES*

At Joppa Glass we wind all of our elements to your custom specifications. If you are not sure of what you want, please call Dudley at (603) 456-3569 for a free consultation.

When ordering elements please have this information:

- What your kiln is made of, i.e., soft brick, frax or the like.
- The temperature you plan to achieve.
- The dimensions of your kiln, which include the following:

1. Inner kiln dimensions
2. Wall thickness and materials used
3. Crown thickness and material used
4. Floor thickness and construction
5. Door size and location

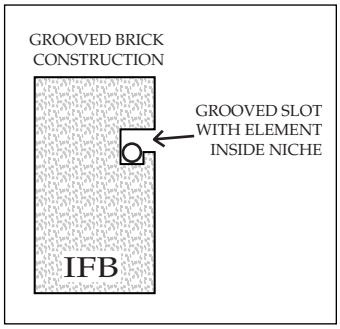
Please read "Dudley's Element Paper" for a rather complete set of directions for working with electric elements: Methods of installation, wiring diagrams, etc. Please view our element section at <www.joppaglass.com/elements/>.

Three Basic Element Installation Methods:

The Grooved Brick Technique:

The grooved brick technique is the traditional method of installing elements in soft brick kiln.

Advantages:

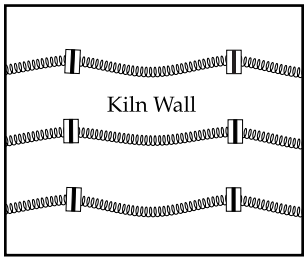


1. Relatively shock proof. The element is not exposed
2. Mostly Student resistant. (Nothing is student proof.)
3. Easy installation.
4. Heavy duty, long oven life. You will tire of the oven long before it wears out as its life expectancy is 25-30 years.
5. Heat retention. The oven has lots of mass so if the door is opened, it will not chill as quickly as would a fiber insulated oven.
6. Wide heat use. This oven can be used over a wide temperature range: annealing at the low end (950°F), glass casting in the middle range (1600°F), and high fired ceramics on the top end (2200°F).

Disadvantages:

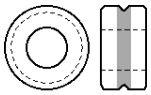
1. Dinosaur construction. It is heavy and hard to move.
2. More expensive to operate. Costs more to heat up and operate than does an all fiber model. In order to anneal glass at 950°F you first have to heat all the bricks to 950°F. Over the life of the oven this could mean a lot of money, perhaps thousands of dollars.
3. This kiln design takes longer to heat up, a time and cost issue.

The Donut System:



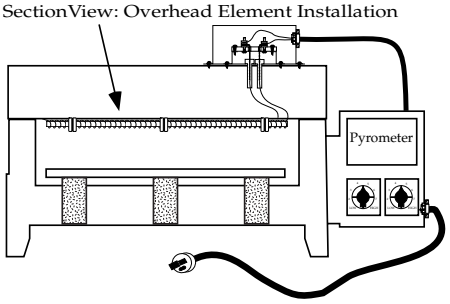
The simple "Donut System" is best used in annealing kilns (not to exceed 1150°F) along vertical walls. It is normally used with the all-frax kiln wall, though it can be used with (IFB) brick kiln construction. The ceramic insulators, "donuts," are normally placed one above the other as shown in the illustration to the right. They should be spaced about every 6" to 8" horizontally. Some natural slump of the elements will occur without any problems, i.e., though the elements will sag a little they will not short out and will be electrically secure. **The elements simply hang in tandem.** Please note this type of installation is used for annealing situations only. For temperatures above 1150˚F we recommend using the grooved brick construction discussed above, or use our Ceramic Rod Suspension System shown below.

The "donut" is a disc shaped ceramic washer that looks like this:



The Ceramic Rod Suspension System:

To completely control the placement of your elements we recommend the ceramic rod suspension system. The ceramic rod provides internal support for your elements while the "donut" insulators hold everything in place. We recommend this system especially for overhead placement (as in slumpers and fusers) or for other important situations where you don't want the element to move one iota from its location.



The Joppa Glassworks "Donut" System

Recently our source for Cordierite rods and components has gone out of business and I have been unable to find a reasonable replacement for those products. For now all I can offer in this department of "Donuts and Rods" are the #5 size. For the future we still have a good supply of the #5 Mulite Donuts. Some customers are using our #3 element and encasing them in Fused quartz tubing for support and hanging them in the #5 donuts. This ends up being a fairly long element. If you are interested in this approach please give me a call.

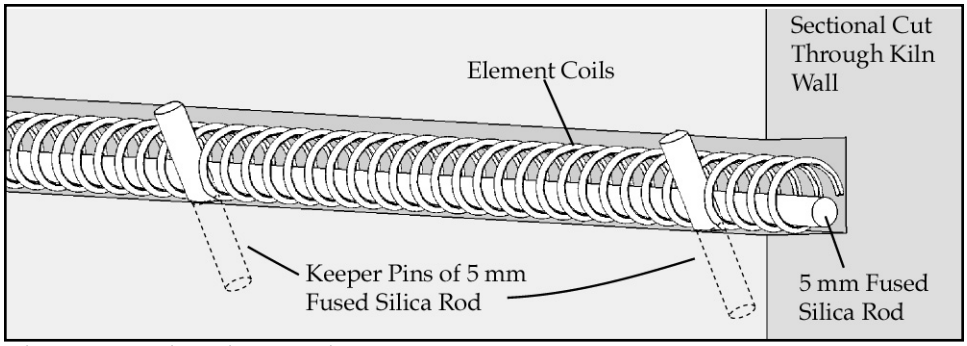
#5 Donut
Mulite
ID=0.450"
OD=0.780
Cost $1.25

Dudley Giberson at 603-456-3569

The 1/4" x 30 " Mulite Rods cost 24.50

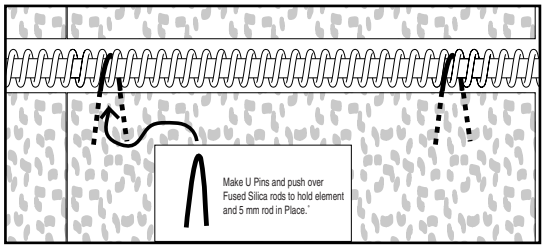
The #5 Donuts cost $1.25 each

Here is an Idea that works extremely well:



This is an idea that works 100% to keep the element permanently in its groove. And, yes, it does cost more in both time and materials to install but the end result is an element that stays put and in this condition will give you element longevity. The place where most elements fail is at the connection box when a split nut connector loosens over time and arcs which burns through the element leads or here in the middle of the element when it jumps out of the groove and touches something or sticks to something and is broken while attempting to put back in the groove. This is simple stuff that works. This is generally installed using sections of 12" to 15" long. Use two hairpins per section of fused silica rod.

A second method for securing the 5mm rods:



In this image we see fused silica rods (5mm) inserted into the middle of an element and pinned in place using stainless steel welding rod x 3/32" diameter. You can also use regular Kanthal wire, like 16 Gauge.

Fused Silica Fill Rod = $5.40/ foot

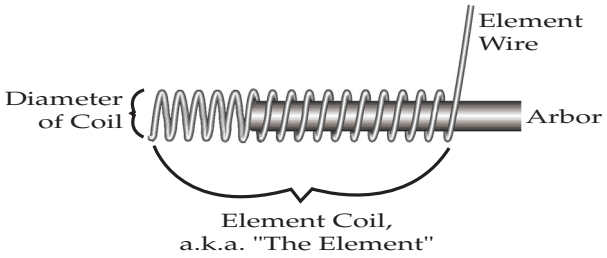
How We Name Our Elements

E 240 - 14 - 16 6

Prefix **Voltage** **Amps** **Wire Gauge** **Arbor Size**

The Element's Shape

- The "arbor" forms the inside diameter of the element.
- The outside diameter is equal to the thickness of the "arbor" plus two diameters of the raw wire plus a little “spring-off” expansion, usually less than 0.010”.



Element Arbor Size	Inside Diameter of Element (before stretch)	Approximate Outside Diameter of Element	Used with Wire Diameter	How element is Generally Used	
8	.540	.655	15 & 16	Use 1/2" Support Rods: Mulite or Fused Silica	No More Supplies of #8 Donuts and Rods
7	.405	.525	15 & 16	~~#7 Donuts With 3/8" Cordierite Rods~~	No More Supplies of #7 Donuts and Rods
6	.375	.500	15, 16, & 18	Grooved Brick Construction Also with Fused Silica Fill Rod	
5	.3125	.375	Sometimes 15, Usually 16, & 18	Donut System & With 1/4" Mulite Rods	Very Good Supply of #5 Donuts
4	.250	.3125	16, 18, 20 & 22	Sometimes Used With Grooved Brick Installs	Can be Contained Using 5mm Fused Silica Fill Rods
3	.1875	.250	16, 18, 20 & 22	Mini Elements Used inside Quarts Tubing to make protected elements.	Used with 12mm x 10mm Fused Quartz Tubing

ELEMENT PRICE LIST

At Joppa Glassworks, Inc. we stock several kinds of element wire, specifically "Kanthal" type in several gauge sizes (22, 20, 18, 16 & 15) and "Nichrome" type in 17 gauge. We make all elements to order. Are you in a hurry? Please let us know and we will try to get your order out that day.

The name of the element you order has a structure that holds information (see page 14). The last number that goes in the bracket stands for the arbor size. **We wind elements on 6 different arbor sizes coded 8, 7, 6, 5, 4, & 3, so that number goes in the "( )" below.** To order elements, call Dudley for a free consultation (603-456-3569). Have your kiln specs handy (reference page 11). The prices of our elements have changed very little over the years. We don't list every model we make as there are many variants. We list this sampling of elements to give you a specific idea of our prices.

I am more than happy to discuss why you would want one type of element over another. There are many issues that effect choice of element configuration, such as amount of stretch, kiln size, what the kiln is made of, maximum working temperature, etc. A well matched element should last for many years.

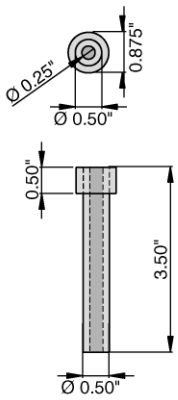
Element Name Place "Arbor" Size in the "( )" below	Volts	Amps	Watts	Wire Gauge	Comments	Price
E240-14-16( )	240	14	3360	16	Standard Element	45.00
E240-14-15( )	240	14	3360	15	Heavy Duty	48.00
E208-14-16( )	208	14	2912	16	Standard Duty	45.00
E208-14-15( )	208	14	2912	15	Heavy Duty	48.00
E240-12-16( )	240	12	2880	16	Longer Lasting	48.00
E240-12-15( )	240	12	2880	15	Very Heavy Duty	52.00
E208-12-16( )	208	12	2496	16	Standard Duty	45.00
E208-12-15( )	208	12	2496	15	Super Duty	48.00
E240-10-18( )	240	10	2400	18	For Pick-up Ovens	42.00
E240-10-16( )	240	10	2400	16	Longer Lasting	55.00
E240-08-18( )	240	8	1920	18	Medium Duty	46.00
E240-08-16( )	240	8	1920	16	Longer Lasting	65.00
E240-05-20( )	240	5	1200	20	Medium Duty	33.00
E120-14-16( )	120	14	1680	16	Standard Duty	27.50
E120-12-16( )	120	12	1440	16	Standard Duty	30.00
E120-10-16( )	120	10	1200	16	Long Lasting	32.00
E120-08-18( )	120	8	960	18	Medium Duty	28.00
E120-06-20( )	120	6.25	750	20	Bead Kiln Element	27.50
E120-05-22( )	120	5	600	22	Sm. Heater Kiln	27.50

ALL PRICES SUBJECT TO CHANGE , WITHOUT NOTICE

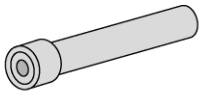
Our Thru-Tubes

These "Thru-Tubes" insulate the element leads as they pass through the metal kiln shell and walls.

This is about the tenth iteration of the ceramic through tube for Joppa Glassworks. Their purpose is to insulate the element leads as they go through the kiln wall. These are called **Lead Tube Insulators,** or **Wall Tubes.** These are a ceramic composite– the tube section is made of 1/2″ cordierite and the Knob End is made of a tough new cast ceramic Mortar. The standard length is 3-1/2″ as shown for $8.25. These can be made longer or shorter for a modest fee.



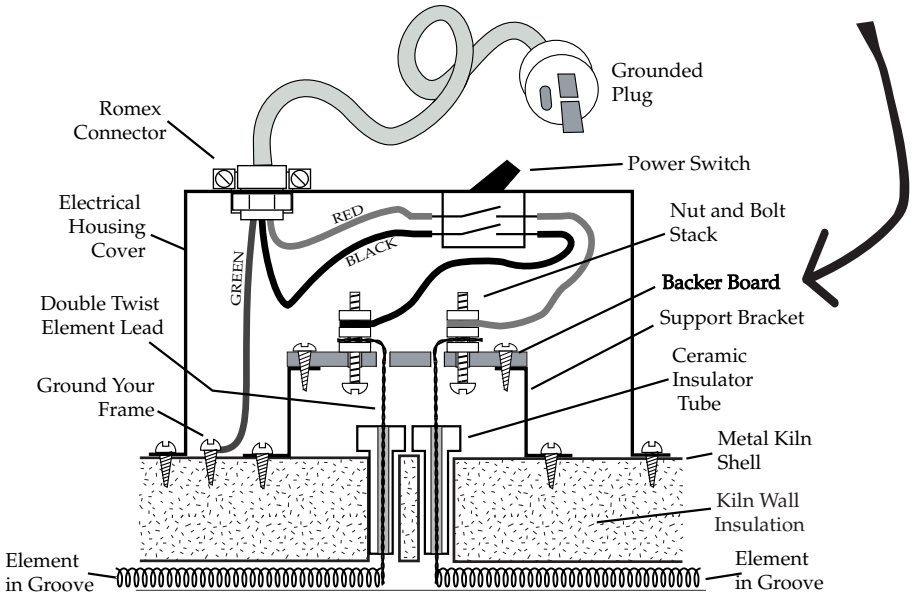
Our 3.5" Cast Head end Lead Tube, a.k.a. "Wall Tube" or "Thru-Tube"



$8.25 ea.

Power Connection Boards:

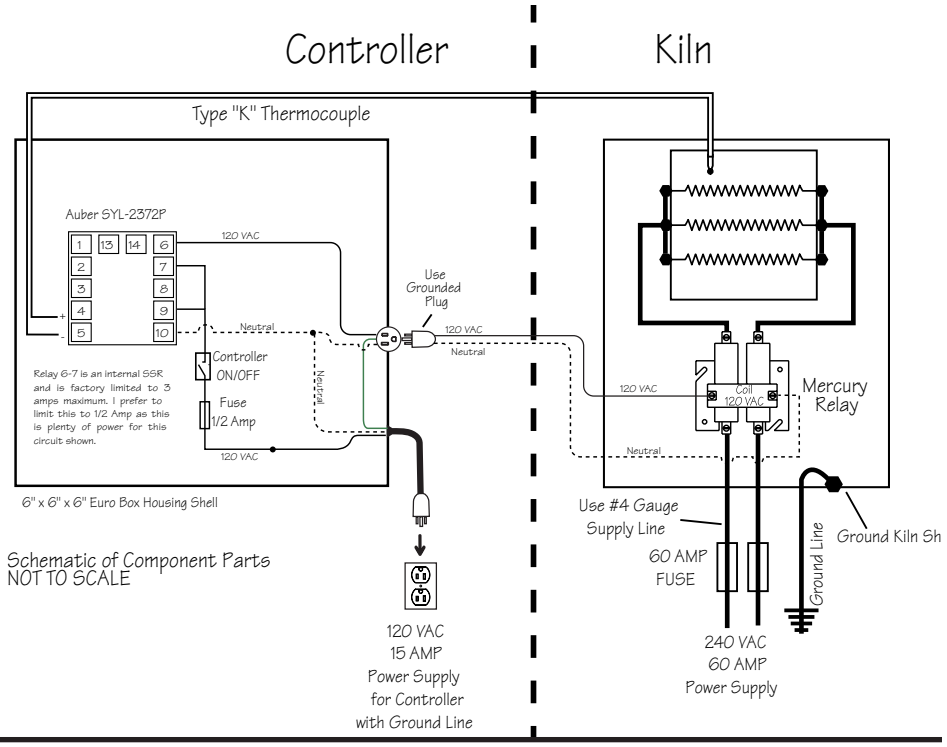
In the past we offered marinite for building your electrical connection boards. But the product became vastly overpriced. We now recommend using "backer board" which you can purchase at your friendly Home Depot or we sell small sections suitable for this purpose: 4″ x 4″ = $7.50 and 6″ x 12″ = $14.00



Top View of Connection Board Mounted on Kiln Wall

JOPPA GLASSWORKS CONTROLLER KITS:

Below is a typical wiring diagram for controlling an electric kiln. Various wiring diagrams are offered in *Construction Paper #3, "How to Build Your Own Controller, Vers. 3.5.5"* $10.00- but **free** with the purchase of any of the Auber controller modules.



Joppa Glassworks, Inc., sells 4 controller kits:

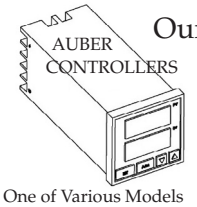
Set Point Kit #1 (Syl 2352 Controller Module, 25 amp SSR, heat sink, & type K Thermocouple), + "How to Build Your Own Controller, vers. 3.1"..... $175.00

Set Point Kit #2 (Syl 2372 Controller Module, 50 amp Mechanical Relay, type K Thermocouple, + "How to Build Your Own Controller, vers. 3.5.2"..... $175.00

Ramp and Soak Kit #1 (Syl 2352P Controller Module, 25 amp SSR, heat sink, type K Thermocouple), & "How to Build Your Own Controller, vers. 3.1.... $225.00

Ramp and Soak Kit #2 (Syl 2372P Controller Module, 50 amp CN-PBC402-120VAC Relay, type K Thermocouple, & ".... Your Own Controller, vers. 3.5.5"... $185.00

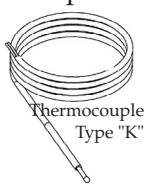
Our kits are made from these component parts:



One of Various Models
Syl 2352, 2352P, 2372, & 2372P

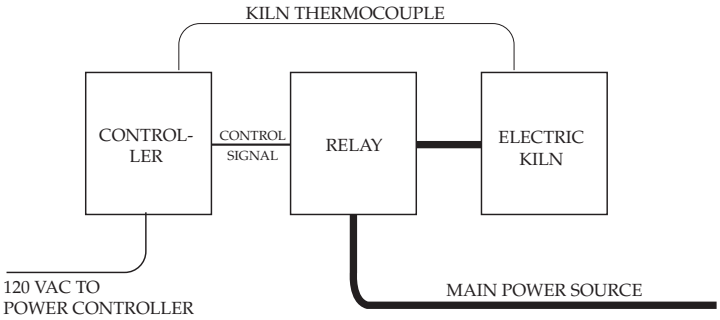

Heat Sink


25 Amp SSR



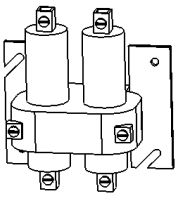

50 Amp Resistive Electro-Mechanical Relay

HOW TO BUILD YOUR OWN KILN CONTROLLER SYSTEM:



In this standard scheme the kiln is controlled by a programmable controller. It sends a signal to the relay which closes a circuit which sends the main power to the electric kiln. The controller reads the temperature through the thermocouple and determines when to activate the relay. Using our kits (page 18) and parts (page 19 bottom) you can construct your own system.

For heavy duty kiln control there are several choices: Mercury relays, Contactors & SSRs



Mercury Relay

We currently sell two sizes of mercury relays-

MFG	Product No.	Coil	Amps	Cost
Durakool	2035A120AC	120Vac	35 Amps	160.00
Durakool	2060APS120AC	120Vac	60 Amps	195.00

Made in USA
These prices have been volatile in the last few years. I can provide an exact price quote on request. Please call 603-456-3569

A solid option for a medium duty situation: use an electro-mechanical contactor to mate with the Auber 2372P. Shown here to the right is the #CN-PBC402-120V which can handle up to **50 amps of resistive load** and has a 120 VAC control coil. It can control both 120 or 240 VAC loads and costs $36.00. This is a great choice for controlling small to medium sized kiln. If you need something larger please ask for quote.

Mechanical Relay
#CN-PBC402-120V $36.00

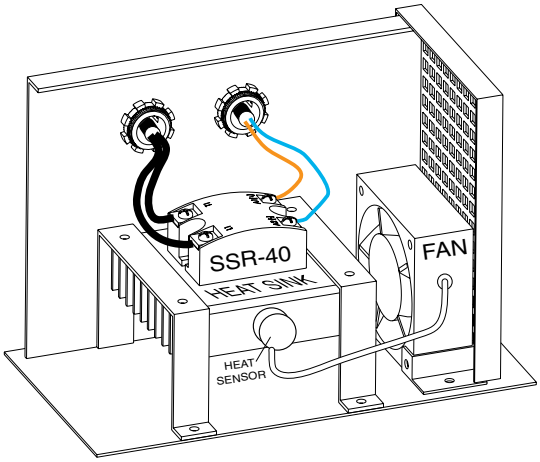
SSR and Heat Sink
The SSR goes on the inside of the control box.

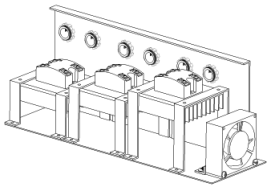
And for those who prefer the SSR solution we still sell the 25 amp SSR for $35.00. This should be mated with a heat sink shown on the left. The combination heat sink and relay sell as a kit for $70.00 which includes heat transfer paste and mounting screws. This relay should be powered by the Auber Syl-2352P or Syl-2352 controller module which puts out a 12 VDC control signal which turns the SSR on and off. If you chose the SSR solution, pay close attention to construction of the heat dissipation system as the better this works, the more trouble free will be your kiln controlling experience. I recommend using a small computer fan to blow air onto the heat sink. If you keep this SSR cool and not overload it, this is the best of all solutions- quiet and efficient, and you can utilize short cycle times to minimize temperature drift. (More see p. 20.)

A GREAT WAY TO USE THE SSR:

A COMPUTER FAN FOR A RELIABLE COOL RIDE.

There are a good many reasons to use the SSR technology– mostly because it is gotten to be pretty reliable and inexpensive. The part I was most uncomfortable with was the failure rate when guys first started to use them to control their annealing kilns. There are some big **NO-NOs:** Do not mount this on a warm surface, like a kiln wall, because it will last for about an hour and you will have a mess. You have to spend time actually thinking about this and designing a system to keep the SSR Cool and here it is– the lowly little computer fan.





These items can be piggy-backed to control 3 phase kilns as well.

Components	Cost
40 AMP SSR	35.00
FAN KIT with Heat Sensor	34.00
HEAT SINK	28.00
HEAT TRANS PAD	2.10

(The stilts and screening and container are homemade)
Box should be electrically secure and vented both front and back with screening..

Most people don't like MICRO-INSTRUCTIONS. Well, me neither. But this is one place where when the cop says, "keep your hands on the steering wheel so I can see them at all times," don't scratch yourself.

I am pretty excited about this system as we have been using it for about 4 years and it really works. It also is getting way more attractive when you consider it is now illegal to ship Mercury products to some states.

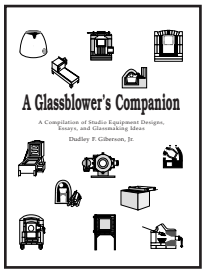
Oh, Bless were the days when the science teacher would dole out a dollop of liquid Mercury to all the 4th graders to play with. I am sure some people knew that was not a great idea, but it was somewhat of a thrill to chase the little balls around with your finger to make several little balls turn into a big one.

I can read the writing on the wall: Mercury is a HUGE RED FLAG and it is a prudent thought to accept this unyielding fact. Lucky then are we that here is a great solution to your kiln controlling needs.

Literature Corner:

Dudley's text book, *A Glassblower's Companion*

by Dudley Giberson



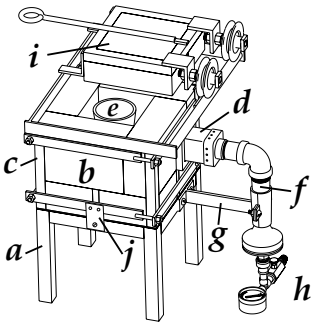
A Glassblower's Companion is about Giberson's views on glass technology. The book is 136 pages, indexed, with over 300 excellent illustrations showing how to build and maintain a wide variety of glass making equipment including ten glass melting furnaces, five glory holes, five annealers (including fuser-slumpers), and five accessory pieces of studio equipment. It is a must for anyone serious about glass blowing and maintaining a glass making studio.

The material is presented as a collection of essays which focus on the underlying philosophy of hot glass. It is a document that is of interest to anyone who works with glass whether he/she is a glassblower, a pate de verre caster, or a modern beadmaker, even someone who simply collects and loves glass. Archaeologists will be especially interested in the ancient glass explanations, as Giberson focuses on simple ideas that work. 4th Printing. Price $35.00.

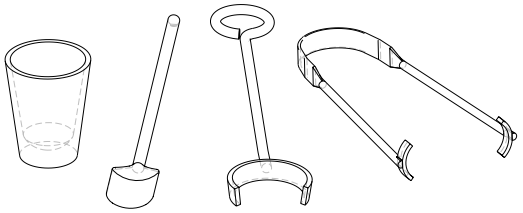
What's New and Exciting? Read about Our Mini-Foundry Protocol. And then build a mini-foundry for yourself and have some fun.

Papers of interest:

1. "The Development of a Mini-Foundry Protocol," by D. Giberson 2012
2. Images and Information Concerning the Cope and Drag Foundry Technique, by D. Giberson, Summer 2012.
3. "3 Design Projects Using the New Mini-Square Gibersons.
4. "New Ideas for the Use of Small Burners in the Glass Shop, Foundry, Pottery, and Smithy," by D. Giberson. (These papers are free to download from <www.joppaglass.com/new_ideas/foundry/3_ways.html>.)



The parts of the furnace: base with legs (*a*), the furnace body (*b*), the upper frame (*c*), the burner head (*d*), the crucible (*e*), the Ransome V100 venturi (*f*), the burner brace (*g*), the needle valve and gauge (*h*), the furnace door (*i*), and lastly, the positioning tab (*j*)



Set of foundry tools: this image shows some of the pieces I sometimes make for folks interested in this approach to studio fun. The 4" crucible can be purchased on Ebay. The three tools, a skimmer, an 18" pouring handle, and a pair of 16" tongs for lifting the crucible from the furnace, aka, "The Tool Kit," sells for $185.00

On the left: Complete 2" Burner system for the furnace includes the Burner Head, the Ransome V-100 Venturi, a needle valve and a gauge, all for $348.00. One other item you may wish to purchase is a burner block for $30.00. I highly recommend it as it is inexpensive, prolongs burner life, and promotes great combustion!

Helpful Charts and Information

ORIFICE CHART FOR MATCHING GAS FLOW TO YOUR MIXER SYSTEM

Burner Head Size	Btu Range (1000'S)	Low Pressure Natural Gas (6-8"w.c.) Drill Size (inches)	Low Pressure Propane Gas (6-8"w.c.) Machinist Drill Size	High Pressure Propane Gas (0-25 psi) Machinist Drill Size
B-650	50-195	5/16" orifice	#30 orifice	#56 orifice
B-255	40-150	17/64" orifice	#36 orifice	#57 orifice
B-250	36-120	1/4" orifice	#38 orifice	#58 orifice
B-250S	25-95	15/64" orifice	#41 orifice	#59-60 orifice
B-7/32	20-70	7/32" orifice	#43 orifice	#62-65 orifice
B-3/16	10-45	3/16" orifice	#46 orifice	#65-72 orifice
Sq. 2.5-7/32	13-52	#32-30 orifice	#43 orifice	#69 orifice
Sq. 2-7/32	10-40	#39-37 orifice	#48 orifice	#72 orifice

For more information on orifice size vs fuel use visit: **www.joppaglass.com/burner/burnr1.html** and click on either "Low Pressure Charts or "High Pressure Charts" at the bottom of the page.

Drill Index of Common Sizes Used For Orifices

DRILL SIZE	DECIMAL EQUILIVANT	DRILL SIZE	DECIMAL EQUILIVANT	DRILL SIZE	DECIMAL EQUILIVANT
1/64"	0.016	#55	0.052	3/32"	0.094
#72	0.025	#54	0.055	#41	0.096
#71	0.026	1.4 MM	0.055	#40	0.098
#70	0.028	#53	0.059	#39	0.099
#69	0.029	1.5 MM	0.059	#38	0.101
#68	0.031	1/16"	0.062	#37	0.104
1/32"	0.031	1.6 MM	0.063	#36	0.106
#67	0.032	#52	0.063	7/64"	0.109
#66	0.033	1.7 MM	0.067	#35	0.110
#65	0.035	#51	0.067	#34	0.111
#64	0.036	#50	0.070	#33	0.113
#63	0.037	1.8 MM	0.071	#32	0.116
#62	0.038	#49	0.073	#31	0.120
#61	0.039	1.9 MM	0.075	1/8"	0.125
1 MM	0.039	#48	0.076	#30	0.128
#60	0.040	#47	0.078	#29	0.138
#59	0.041	5/64"	0.078	9/64"	0.141
#58	0.042	2 MM	0.079	5/32"	0.156
#57	0.043	#46	0.081	11/64"	0.172
1.1 MM	0.043	#45	0.082	3/16"	0.188
#56	0.046	2.1 MM	0.083	13/64"	0.203
3/64"	0.047	#44	0.086	7/32"	0.219
1.2 MM	0.047	#43	0.089	15/64"	0.234
1.3 MM	0.051	#42	0.093	1/4"	0.250

WEIGHT OF GLASS IN A POT

155 Lbs. per c.f.

INSIDE OF CRUCIBLE		VOLUMN IN CUBIC INCHES	WEIGHT OF GLASS
DIAMETER	HEIGHT		
18	12	3053.63	273.91
17.5	11.75	2826.20	253.51
17	11.5	2610.27	234.14
16.5	11.25	2405.53	215.77
16	11	2211.68	198.39
15.5	10.75	2028.44	181.95
15	10.5	1855.50	166.44
14.5	10.25	1692.58	151.82
14	10	1539.38	138.08
13.5	9.75	1395.60	125.18
13	9.5	1260.96	113.11
12.5	9.25	1135.14	101.82
12	9	1017.88	91.30
11.5	8.75	908.85	81.52
11	8.5	807.78	72.46
10.5	8.25	714.37	64.08
10	8	628.32	56.36
9.5	7.75	549.34	49.27
9	7.5	477.13	42.80

Insulation Value and Strength Comparison of Some Common Kiln Building Materials

Strongest material			Medium strength		Weakest material
G-20 IFB	K-20 IFB	Rigid Fiberfrax board	Block insulation	Cast block mix	Fiberfrax 8 lb. density
"Ins" value 4.25	"Ins" value 5	"Ins" value 12	"Ins" value 9	"Ins" value 10	"Ins" value 14

Watts needed per cubic foot of kiln space

(Chart to calculate the overall heat requirements for a kiln)

Sample wall material→		(4.5" IFB)	(2.5" IFB + 1" Frax)	(3" Frax)
Use	Degrees F	"Ins Value" = 19	"Ins Value" = 25	"Ins Value" = 42
↓	↓	——————(Watts per cubic foot= wpcf)——————		
Annealing	950	900 wpcf	700 wpcf	500 wpcf
Pick-up	1150	1000 wpcf	825 wpcf	650 wpcf
Slump	1500	1500 wpcf	1200 wpcf	900 wpcf
Casting	1650	1650 wpcf	1325 wpcf	1000 wpcf
Pottery	2250	2000 wpcf	1800 wpcf	1600 wpcf

Price List

Burners and related merchandise:

Giberson Ceramic Burner Heads, (p.2 for sizes to match equipment)	
Standard 4″ diameter Giberson Heads (six sizes, same price)	195.00
Venturi Package For hp Propane (inc standard head, gauge, needle valve and V150 venturi)	449.50
Mini-Square 2″ Giberson Head (13- 7/32″ holes)	125.00
Venturi package for hp Propane (mini-head, gauge, needle valve and V100 venturi)	348.00
Mini-Square 2-1/2″ Giberson Head (18- 7/32″ holes)	145.00
Venturi package For hp Propane (mini-head, gauge, needle valve and V100 venturi)	368.00
Pipe Warmer Burner Package Kit: Head, Venturi, Needle Valve & parts (page 10)	335.00
Head Only.....	160.00
Dudley's Garage Burner Kit: Head, Venturi, NV(p. 9)	399.00 to 419.00
Head Only	165.00
Needle Valve - All Brass, for high pressure propane- 1/4″ NPT (f)	26.00
Gauge (0-30 psi) 1/4″ NPT (m) glass face plate	23.00
Spare Orifice for Ransome Venturi	6.00

Mixers and Blower:

Alfred Type "Tee" Mixer– 1-1/2″ for Low Press. gasses pg 8.	119.00
Ransome Venturies V150, V125, V100 and V050B (see page 8)	
Dayton 1TDP5 Blower with modifications (see page 8)	$269.50

Elements and element accessories for mounting elements in kilns:

Element Prices (see page 16 for element sizes and prices)	
Backer Board p. 17 (6″ x 12″ x 1/4″ thick) for power connection boards	14.00
" Small (4″ x 4″ x 1/4″ thick) for power connection board	7.50
"Donut" Insulators p. 13 Donut ID x OD x Width	
Donut #5 0.460″ x 0.770" x 0.50″	1.25
Switches for closed door safety switch.....	16.00
Wire for attaching the donuts	
for 30 feet (17 ga. Nichrome is recommended)	11.00
for 50 feet (17 ga. Nichrome is recommended)	16.00
Element Support Rods, p. 12	
1/4″ by 30″ -- Mulite	24.50
Cutting Fee for Ceramic Support Rods	0.50
(if your rods are cut to 15", no boxing fee, as they fit in our 18" standard box) Boxing Fee for full length rods (Hand built double-wall container, min. 5 rods)	10.00

Kiln Controllers (see page 19):

Joppa Set-Point Kit #1: Auber Syl- 2352 plus 25 amp SSR, heat sink, type K Thermocouple+ Plans	175.00

Price List, cont. from pg 24

Kiln Controllers (continued):

Joppa Set-Point Kit #2: Auber Syl- 2372 plus 50 amp relay, type K Thermocouple+ Plans	175.00
Joppa Ramp n Soak Kit #1: Auber Syl- 2352P plus 25 amp SSR, heat sink, type K Thermoc. + Plans	225.00
Joppa Ramp n Soak Kit #2: Auber Syl- 2372P plus 50 amp relay, type K Thermocouple+ Plans)	185.00
Relays: Mercury Relays and Mechanical Relays price list	(see pages 18 & 19)

Literature corner:

A Glassblower's Companion (see p. 21 for more info)	35.00

Construction Papers:

Construction Paper #3, "How to Build Your Own Controller" vers.3.5.5	10.00

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e-mail address: _____

MASTER CARD or VISA ACCOUNT NUMBER

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