My home foundry: Forced air burner info for the hobby foundry worker.

Notes from issue no: 02. Of: **The Hot Metal Ezine.**

Topic 01: Gas Burners

FORCED AIR- BURNERS.

Gas furnace burners seem to create the biggest problems for the hobby metal casting worker, we constantly hear and read about people who are trying to get their furnaces built in the hope of melting some aluminium or bronze, only to have all sorts of problems with the Burner?

Most people seem to be able to build a reasonable furnace to carry out their craft, BUT the BIG stumbling block seems to be:

THE BURNER.

WHY?

In the thirteen or fourteen years I've been involved with metal casting, I have to admit that I have not experienced any where near the angst and problems with burners that others post on the hobby casting group forums.
I do not mean to be smug about that statement.

Do burner problems arise because:

A: People are trying to fabricate complex gas burners from detailed drawings without the proper tooling and workshop facilities or machines. Which the original designer would have used to build the complex burners.

Remember what we discussed in the previous ezine about improving your general workshop skills, and upgrading the equipment that you have in your workshop.

Having good workshop skills, and a reasonable selection of equipment, will have a marked effect on how well, you, as a hobby foundry worker, will be able to construct the equipment required for successful melting.

Very often there are no short cuts when it comes to building equipment for your foundry, to cobble something together in a rough fashion is only asking for trouble down the road, as an old trade school teacher used to tell us:

"If a job is worth doing, you might as well do it properly in the first place" I think you will agree, he was right!

The burners that I have constructed are well detailed and documented in the foundry ebook "Build A Gas Fired Furnace" available on our web site.
To explain it in detail here would take up too much space.

However I will attempt to simplify the description:

It is basically a long tube made from plain black mild steel pipe. The burner end nozzle consists of an inverted cone. There is a mid section, which has a venturi; the gas jet is located near the venturi. The brass jet protrudes into the forced air stream passing through the burner tube.
The gas jet orifice is quite large (1/4") and operates under very low pressure, the air delivered to the burner tube is low pressure but moves at high volume.

This burner is about as simple as it can get, but there are components used that require some basic lathe skills and BASIC workshop knowledge.

The burner is not difficult to construct.

The blower is a domestic electrolux vacuum cleaner (the type that has another outlet that blows) it also has an electronic slide control, which enables a very low volume of air to be delivered to the flame during start up. This feature is MOST important during start up.

Does the burner work? You betcha it does, the furnace will melt a 5-kilo charge of Al from a cold start inside 40 minutes.

The gas supply I use is from a 100 lb LP gas tank (Propane in the states)
The gas supply MUST be controlled by a **fully adjustable** industrial diaphragm gas regulator gauge suitable for LP gas, there is no other SAFE way to deliver gas to your furnace burner.

Forget about BBQ gas regulators:
They are next to useless. Been there and done that.... they are not worth the trouble. Unless they are used to deliver gas to small bench-top furnaces.

And don't be tempted to cheapskate and use a ball valve to regulate the gas flow; it is simply NOT possible to FINE-tune the gas/air ratio for optimum performance of your furnace burner using a ball valve.

Use the ball valve as an emergency shut off valve only.

Then why is it that people get themselves into all sorts of bother building & operating complex burners that use special size jets, special shrouds, which must be run at a certain gas/air pressure? People get totally frustrated because the thing won't run properly, you spend half the day stuffing around with something that is an absolute pain in the ass, when you should be enjoying your metal casting experience.

OK, OK, I will get down off the soapbox now.

Don't forget that many of the people who design & build these complex burners have lathes, milling machines and many other expensive workshop tools to build burners that will work when built to the correct specs.
But build it any differently and there is a good chance it JUST WONT WORK!

A simple burner will help stop you from tearing all of your hair out. Think about it!
Gas is still the most efficient high heat output fuel for the hobby caster, it is clean, easy to use, very quick start up, and it is possible to do short melt, or batch runs if required, no other type of heating comes close to gas.
Yes, it is dear to buy in some regions, but I would be loath to switch to another type of furnace fuel.
Burner building instructions are provided in the 3-volume hobby foundry ebook which is available from our web site, you can visit by clicking on the link below.

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