International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 11 | Nov 2020 www.irjet.net p-ISSN: 2395-0072

TEMPERATURE CONTROL IN A FORGE TO MELT ALUMINUM

[1]Haynet Rivera Flores Tlaxcala, Mexico
[2]Jose Luis Hernandez Corona Tlaxcala, Mexico
[3]Gerardo Flores Calderón Tlaxcala, Mexico
[4]Maripaz Pérez Valdez Tlaxcala, Mexico

Abstract The project was to implement an aluminum smeltingforge, controlling the temperature with the lab view program. For the manufacture of this we use different materials such as cement, ceramic bricks, a thermocouple type k, gas valve, among others.

With the help of the LabView program, a program was made for handling and controlling the temperature of the setting in this way it is easier to identify whether the temperature is correct or not, our project offers minimal maintenance, constant operation and no breakdowns.

It should be taken into account that we have to use materials that resist the temperature of 6600 C, such as: clay, ceramic brick and cement.

1. INTRODUCTION In this drafting a design of an aluminium smelter forge is developed, together with this was developed a program for the monitoring and control of the aforementioned aforementioned programmer that we occupy is well called LabView. This makes it possible to make known if the forge is working properly, each of the devices used will be connected to a protoboart these will be easy to identify, as well as detect them physically and individually and subsequently program them.

In addition, this system presents easy-to-understand monitoring for those who are using it.

With this project, the planning and programming of the aforementioned aforementioned is achieved and results in the casting of aluminum and in this way be able to obtain our own required parts obtaining, thus the guarantee of having a few pieces well cast and in its optimal conditions.

Table -1: Gas consumption data during operating time

Tiempo (min)	Consumo (kg)
0	14.7
5	14.4
10	14.1
15	13.8
20	13.5
25	13.2
30	12.9
35	12.6
40	12.2

To make the forge we use the following materials: an LP gas cylinder, quick-drying cement, bricks, cement, cylinder of an extinguisher, as well as different tools, such as drill, cutter, plant for welding, among others.

The parts to be required will be melted into the forge, cast with aluminum since, this metal has a combination of properties that make it very useful, such as its low density and its high resistance to corrosion, its resistance, for its malleability and because it is light weight. It is a good conductor of electricity and heat, is easily machined and is relatively inexpensive. Since the aluminum to be used is safe enough to work with.

Figure-1: equipment construction

The time of the fusion process is 45 minutes which equals 0.75 hours; this is the time required for the combustion chamber to reach 900oC and the casting temperature is optimal.

For the manufacture of molten products; when it comes to metallurgical quality and manufacturing cost, important factors such as the type and arrangement of furnaces influence. Hence it is necessary to transmit heat economically and quickly to the load with a minimum of fire losses and manufacturing treatments.

Fig -2: aluminum casting

It is a lightweight metal, whose density is 2,700 kg/m3

- It has a low melting point: 660oC (933oK).

• It is bright white, with good optical properties and a high reflection power of luminous and thermal radiation.

• It has a high electrical conductivity between 34 and 38 m/Ω mm2 and a high thermal conductivity of 80 to 230 W/m.K.

• Resistant to corrosion, chemicals, weathering and seawater, thanks to the Al2O3 layer formed

After certain research that was carried out we came to the conclusion that the forge will be easy to Manipulate since this will have a 16x2 LCD display with a module and a K type thermocouple. Adapted that will make known the temperature of the forge, the molds of the parts have to have the right humidity so that it can take its correct shape and thus have no faults, in this way it will be easier to obtain the necessary parts.

After deciding that the plaster cast with cement was the most convenient we made a box, which consists of approximately 30x30 cm. The mold or part to be made will be placed on it.

In this article we will show not only the manufacturing process of aluminum gears, but also the process of how the material is melted.

3. CONCLUSIONS

A 1/2 kg capacity aluminum casting forge was designed and built, for ease of making parts, the design criteria such as: cristol diameter, combustion chamber diameter, furnace diameter in addition to the amount of heat required to melt the load were used.

Subsequently, different tests were carried out to prove how reliable the setting was to make the molds.

The tests came out positively, the forge performed is reliable and safe for handling.

References

[1] APLICACIONES Y USOS DEL ALUMINIO http://www.aiim.es/publicaciones/bol2/16_Aluminio.pdf 2011 – 05 – 16

[2] La combustión teoría y aplicaciones., 2a.ed., Madrid- España Tamburini., 1975., Pp 440 – 443

Bibliographies

CENGEL.,A., Transferencia de calor., 2ª.ed., Ciudad de México – México., McGraw-Hill., 1975., Pp 271 – 274

SALVI.,G., La combustión teoría y aplicaciones., 2a.ed., Madrid- España Tamburini., 1975., Pp 440 – 443

ALUMINIO http://es.wikipedia.org/wiki/Aluminio 2011 – 05 – 16

APLICACIONES Y USOS DEL ALUMINIO http://www.aiim.es/publicaciones/bol2/16_Aluminio.pdf 2011 – 05 – 16