

Improvements of Result: At H4 Cutting and Forming Machine



Engineering

KEYWORDS :

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ABSTRACT

For making of glass H4 (Borosilicate), is used extensively in the glassblowing process lampworking, which involves using a burner torch to melt and form glass, using a high speed steel tool. H4 is referred to as "hard glass grade" which is used for making halogen lamp for auto vehicles. Raw glass used in halogen lampworking comes in hollow work tubes. H4 glass has a very low thermal expansion coefficient, about one-third that of ordinary glass. This reduces material stresses caused by temperature gradients, thus making it more resistant to breaking. This makes it a popular material for objects like halogen lamp, where it is essential to have very little deviation in shape. The softening point (temperature at which viscosity is approximately 107.6 poise) of type 7740 Pyrex is 820 °C (1,510 °F). The analyzed result from Nov.2011 to July2012 and gets the satisfactory results at H4 cutting and forming machine in halogen lamp making process.

INTRODUCTION:

A halogen lamp[1] is a type of incandescent lamp[2]. The conventional incandescent lamp contains a tungsten[3] filament sealed within a glass envelope that is either evacuated or filled with an inert gas or a mixture of these gases (typically nitrogen, argon and krypton). When electrical power is applied to the filament, it becomes hot enough (generally over 3,600°F [2,000°C]) to become Incan-descent; in other words, the filament glows and emits light. During operation, the tungsten evaporating from the hot filament condenses on the cooler inside lamp wall, causing the lamp to blacken. This blackening process continuously reduces the light out-put over the life of the lamp.

A halogen lamp[4] comes with a few modifications to eliminate this blackening problem. The lamp, made of fused quartz instead of soda lime glass, is filled with the same inert gases as incandescent lamps mixed with small amounts of a halogen gas (usually less than 1% bromine). The halogen chemically reacts with the tungsten deposit to produce tungsten halides. When the tungsten halide reaches the filament, the intense heat of the filament causes the halide to break down, releasing tungsten back to the filament. This process known as the tungsten-halogen cycle maintains a constant light output over the life of the lamp.

Objective of the study: this study intends to analyze the effect of implemented things such as use of gas flow meter, apply of new maintenance schedule, improved annealing process and the use of square ring.

PERIOD OF THE STUDY: The research study is based on the data taken from the daily report of H4 cutting and forming machine stage in Halogen lamp making process at Autolilte (India) Pvt. Ltd. Jaipur. The present study is made from Nov. 2011 to July 2012 .

TECHNIQUES OF ANALYSIS:

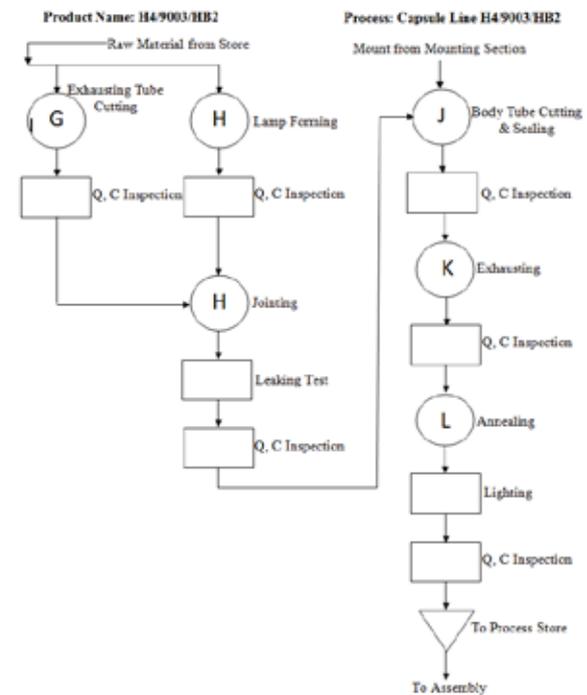
- 1- Collection of daily data
 - 2- Draw X- bar [5]and R-chart [5]
- It provides information to show the variation in rejection and limits.

PROCEDURE AND FINDINGS:

In this research paper I'm going to discuss the things which found after implementations of suggestions at H4 Cutting and Forming Machine stage i.e. reduction in rejection 3.812% to 1.4837%, I observed and collected the rejection data at H4 cutting and forming machine till July 12. The average rejection data of this period were as follows:-

GROUP-1	GROUP-2	GROUP-3	GROUP-4	GROUP-5	GROUP-6
1.40	1.40	1.40	1.38	1.41	1.40
1.37	1.39	1.38	1.41	1.42	1.39
1.35	1.41	1.38	1.40	1.40	1.38
1.34	1.34	1.37	1.41	1.41	1.37
1.37	1.39	1.35	1.38	1.42	1.37

PRODUCT AND PROCESS FLOW CHART



Table

Operation & Inspection		0	Quality control Inspection		8
Operation		6	Storage		1

On the basis of the above observations I found that the reasons for rejections were mainly due to cracking at forming stage and stresses developed during sealing operation, which can be reduced by with the help of better control of pressure of gases and air with utilizing the heating process.

Results for X-bar and R-chart

X-bar	1.366	1.386	1.378	1.396	1.412	1.382
R	0.06	0.07	0.05	0.03	0.02	0.03

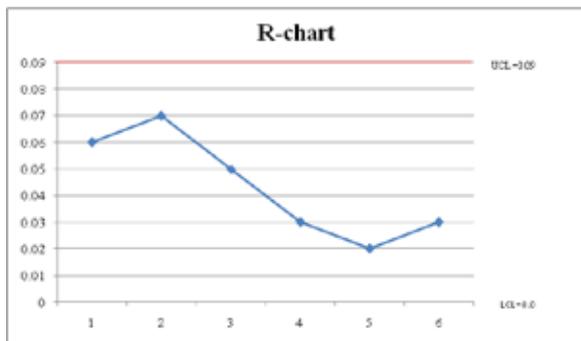
We are able to draw X-bar and R- chart

R -chart

Upper Control Limit (UCL) = D(4) R-Bar

Lower Control Limit (LCL) = D(3) R-Bar

for n = 5, D(3) = 0, D(4) = 2.114 as per standard table

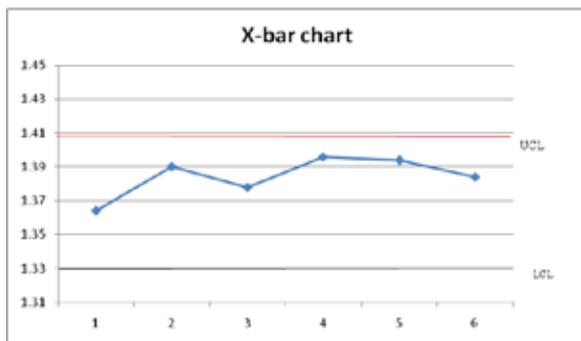


X-Bar Chart

Upper Control Limit (UCL) = X-Double BAR + A(2) R-BAR

Lower Control Limit (LCL) = X-Double BAR - A(2) R-BAR

for n = 5, A(2) = 0.577 as per standard table



CONCLUSION:

Gas flow meter and blower were used to monitor and maintain proper gas flow rate, control cooling during annealing. Further the production was asked to adopt new maintenance schedule having some minor variations to control rotor alignment.

After implementation the above suggestions the rejection data were collected at cutting and forming stage,X-bar and R-chart were drawn and find the limits of UCL and LCL in acceptable range (as mention above) for the process.

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