

# STUDY ON INFLUENCE OF SILICON PERCENTAGE ON FLOWABILITY OF BINARY ALUMINIUM-SILICON ALLOY

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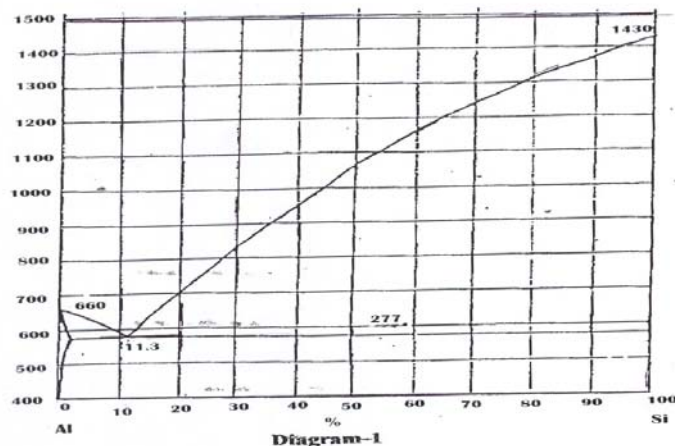
## Abstract

Study on flowability of liquid of binary aluminium-silicon with the difference percentage of silicon is carried out by using CO<sub>2</sub> mold and with the spiral pattern. The result showed that flowability of molten metal of aluminium-silicon alloy has increased when the percentage of silicon is increased in the range of 14-16 %. The length of the spiral decreased when percentage of silicon more than 16 %. This study helps us to design good casting product especially deals with thin and unique parts of the molds.

Keywords: Non-ferrous alloys;Foundry Metallurgy

## Introduction

Binary aluminium-silicon alloy is a good engineering alloy.arrest of corrosion and high strength,that is why this alloy using widely in all commercial application.Diagram aluminium-silicon as shown at diagram 1.



Study of liquid flowability of metal is very important because of it's relation with capability to fill the mould.especially for the molds which have thin and unique form.This study is to evaluate the influence of element silicon on aluminium-silicon alloy reespecially on it's flowability.Analysing of microstructure observation shown that there are relation between solidification characteristic with it's flowability.To know the

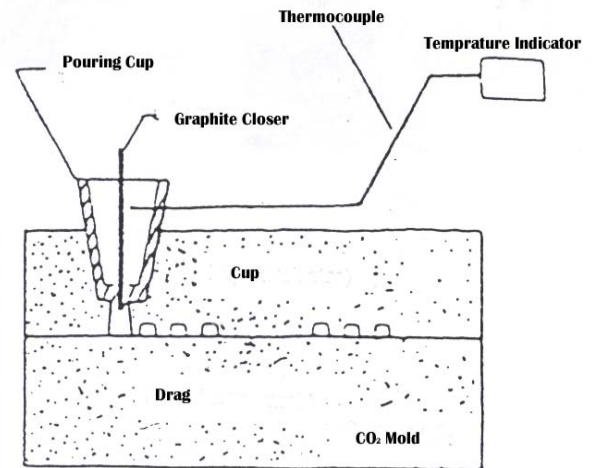
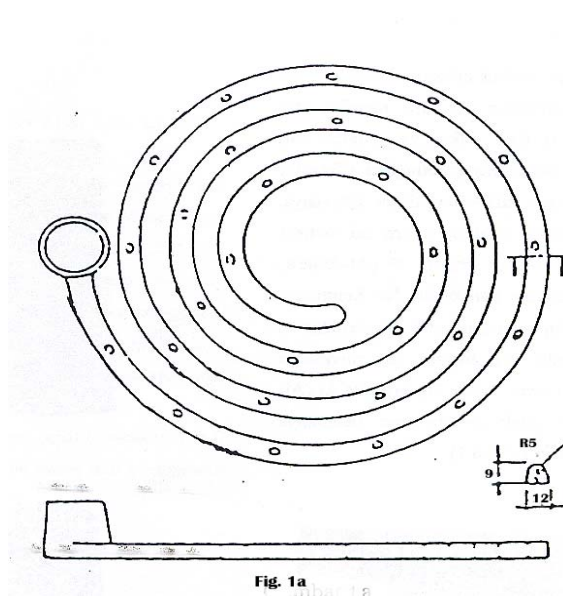
influences of silicon percentage on flowability of aluminium-silicon alloy,aluminium-silicon alloy with the differences of silicon percentage to poured to the each molds (using the spiral pattern) of CO<sub>2</sub> process..

### Experiment and discussion

Prepared some of CO<sub>2</sub> molds using spiral pattern and also some of aluminium –silicon alloy with the differences of silicon percentage.

Spiral molds shown in fig. 1 a and 1 b.In this study aluminium-silicon alloy with the different silicon percentage like 0;4.5;6.5;9.0;11.3;13.0;14.0;16.0;

18.0 and 20.0.Pouring temperature for this experiment is 700 ° C.The length of the spiral will be measured after aluminium-silicon in solid condition.



The results are as follows:

Si (%)	Length of Spiral (cm)
0	85
4.5	71
6.5	82
9.0	89
11.3	103
13.0	151
14.0	159
16.0	162
18.0	145
20.0	122

Some of the spirals used for analyse the relation between microstructure and the length of the spiral .In this study chosed 9.0% silicon (hypoeutectic); 16.0% silicon and 18.0% silicon (hypereutectic).

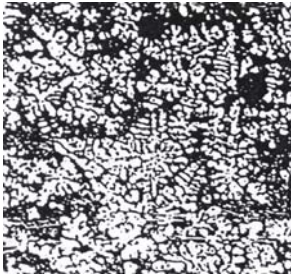


Fig 1. 9%Si 100X

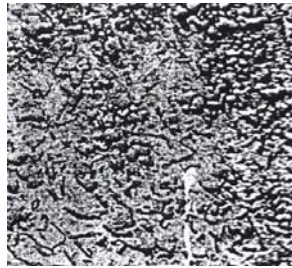


Fig 2. 16%Si 100X



Fig 3. 18%Si 100X

From the result of microstructure shown above that hypoeutectic (9.0% Si) the structure of aluminium dendrite is not homogeneous, big and not flatten form. Hypereutectic (16 % Si) the structure of aluminium dendrite is flatten and nearly rounded form and hypereutectic(18% Si) the structure of aluminium dendrite is not flatten and lengthen form.

## Conclusion

1. Flowability of aluminium-silicon alloy increased until 16 % of silicon.
2. From the result shown that there are the relation between flowability and microstructure where hypereutectic (16 % silicon) has flatten and rounded form and has maximum flowability.
3. This result could be a reference for factories using binary aluminium-products
4. The same study also could be made for binary aluminium with another elements. for example aluminium-copper, aluminium-zinc, aluminium-magnesium and others.

## References

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