ISSN 2395-1621

To maintain Insert dimensions by using Both Side Pressing method in powder compacting process

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ABSTRACT

Inserts are used for metal cutting operation. While removing material from Metal to maintain close dimension that is important part in machining operation. To maintain close dimension while operation is depends upon close dimension of insert. While cutting operation inserts all sides are used .For that all sides are close in dimension to avoid variation in component while operation like Turning, Milling & Metal cutting etc. Inserts are manufactured by powder pressing. After sintering process dimension of inserts is changed. So to maintain dimension of insert we take number of trails to set insert data in blank. The method used for that is Top pressing but in Top pressing pressure are more in top side so there is variation top & bottom side insert dimension which cause low value of Centre of Process (CP) & Process capability Index (CPK) if this value is less than 1.1 & 1.33 then all inserts are rejected. Those values are calculated while setting insert data for manufacturing insert.The objective of Project - The problems coming by earlier method is reduce by using both side pressing method (Continuous pressing method) Which is not yet used in company. This method gives equal dimension in both side of inserts & maintain perfect dimension after sintering process also. This helps to improve quality, productivity, Customer satisfaction & problems of machine cylinder valve & data calculation for taking different trails which save time & human efforts. By doing experiment of both method & doing comparison of both method & good result submit to company to use better one method.

Keywords— **cpcpkstastitical process control Insert Press Method**

ARTICLE INFO

Article History

Received :18th November 2015

Received in revised form :

19th November 2015

Accepted : 21st November , 2015

Published online :

22nd November 2015

I. INTRODUCTION

In insert manufacturing powder is compressed by using press machine.There are many methods for pressing powder.But in Top pressing method pressure is applied on by top side in this cycle top move in die and bottom punch is steady and green powder blanks is produced.While applying pressure only form top side fine pressing is done on top side so there is less porosity on top side and more in bottom side. Effect of that after sintering process green compact is more shrink on bottom side and less in top side. This will cause effect on parameters of insert i.e. IC (inscribed circle) , M diamensions,Cutting edge distance & Thickness .Some time Taper on insert this will lead to low values of CP (centre of process) & CPk (process capability index.Due to this whatever production is carried out is rejected. Such low cp&cpk affect major impact when such type insert when used at time machining operation will gives deviation in machining when operator change the side of insert so all side of insert must have close value.

So to overcome problem due to Top pressing Method both side pressing (Continuouspressing) method is used in this method pressed is applied on a powder by both side so fine

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pressing on both side top and bottom side is done very good and after sintering process shrinkage is equally on both side will leads to give equal dimensions on all side of insert. The Result is calculated by using statistical process. This will gives information regarding acceptance or rejection of production lot which is manufactured.

II. THEORY

Methods used for manufacturing insert is Top Pressing Method in that method top pressure is given by using the value 0.3 the meaning of that top will pressed the powder by 03.mm from top side.

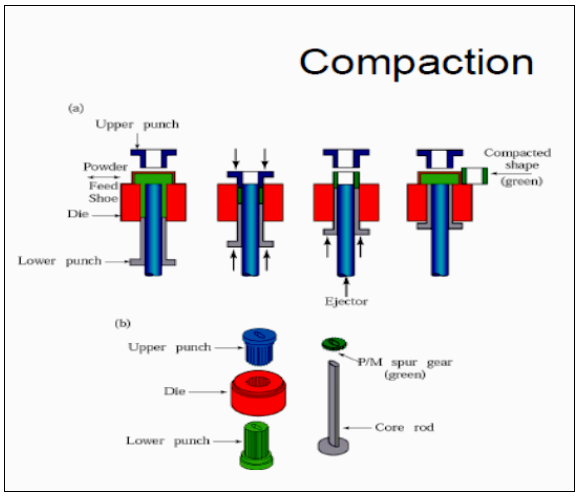


Fig1-Compaction Process[4]

In Top pressing method value 0.3 mm means top will travel distance0.3mmformtopside

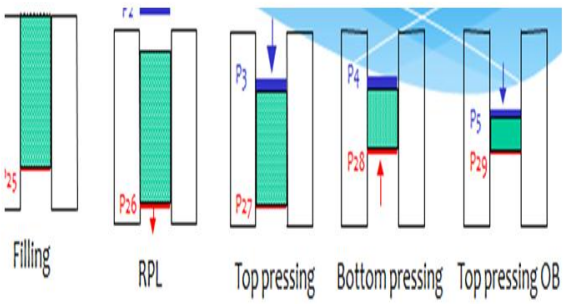


Fig.2Top Pressing Cycle

In continuous pressing method ie both side pressing method the value is given 60% i. e. meaning of that 60% pressing from top side and40% from bottom side.

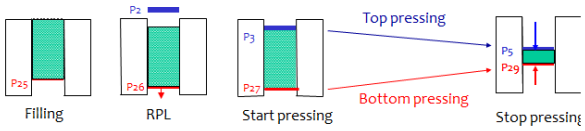
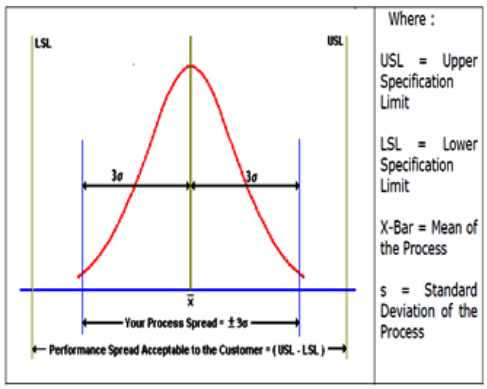


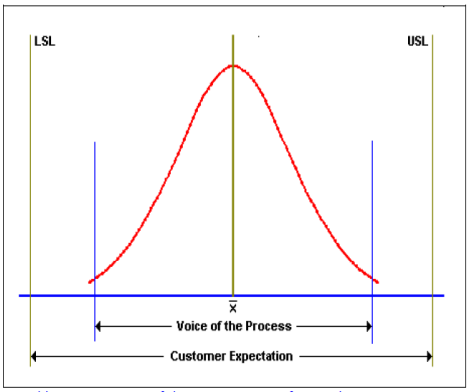
Fig3Continuous cycle(both side pressing)[2]

Following are the graphical details and equations quantifying process capability:



Cpk > 1.33 (A Highly Capable Process)

:ess should produce less than 64 non-conforming ppm



Highly Capable Process: Voice of the Process < Specification (or Customer Expectations).

Fig4 Statistical process control [5]

While conducting experiment and calculating result statistical analysis method is used to check taken reading component is accepted or rejected.

Statistical Method

INDEX	ESTIMATED EQUATION	USAGE
Cp	(USL - LSL) / 6s	Process Capability for two - sided specification limit, irrespective of process center.
Cpu	(USL - X-Bar) / 3s	Process Capability relative to upper specification limit.
Cpl	(X-Bar - LSL) / 3s	Process Capability relative to lower specification limit.
Cpk	Min. of (Cpu , Cpl) or Distance between mean of the process and the closest spec. limit / 0.5 of the process variability.	Process Capability for two - sided specification limit accounting for process centering.

Notes :

1. If X-Bar is at target, then Cp = Cpk.
2. Cpk will always be equal to or less than Cp.

These are standard result from statistical process control (SPC) analysis. By using this theorem result are calculated.

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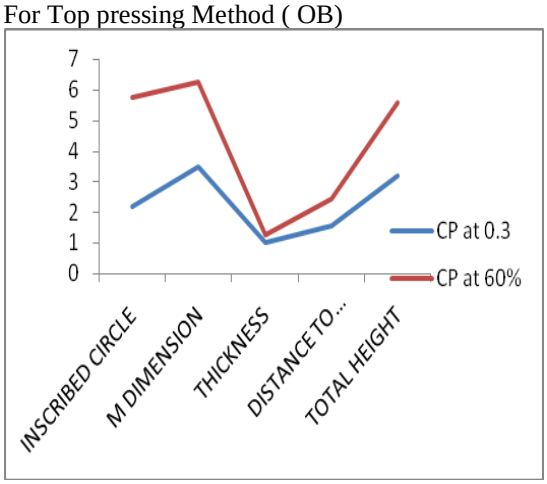
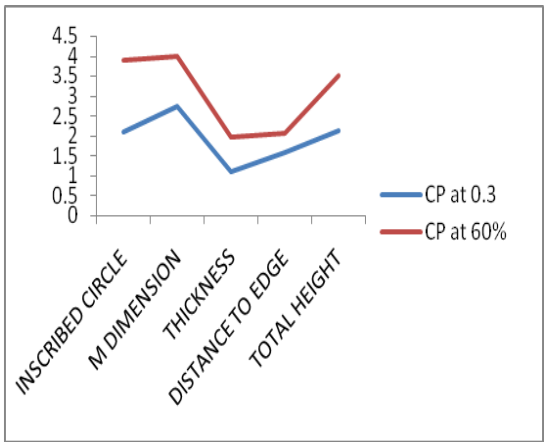
And confirmation of result wether to accept or reject is depend upon following result of statistical process.[5]

III.RESULT AND CONCLUSION

For Top pressing Method (OB)





The better result obtained from Continuous Pressing Method.

This will improve quality of production.

All side dimensions of inserts are Equal.

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