

# **Studying the Effects of Different Magnetic Pole Variations in Processing SmCo Magnets to Optimize the Performance of a Traveling Wave Tube**

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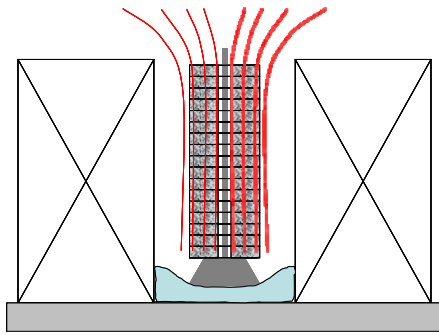
This work was performed as a joint project between Semicon Associates and Communications and Power Industry, to analyze the effects of variable processing methods for Samarium Cobalt magnets in order to optimize the performance in a traveling wave tube. Current observable variables in processing techniques raised question to overall performance within the traveling wave tube. Insufficient data relating the cause and effects of different processing techniques has increased the need for such analysis. Four magnet processing variations will be performed at Semicon Associates and tested on several TWT's at CPI to analyze the performance of different magnetic pole variations.

Current magnet processing methods include stacking multiple magnets within a solenoid for charging and processing one part at a time for adjustment. Solenoid radius and length has raised question to potential problems that may result in slight transverse field within the individual magnet. Transverse fields can be detrimental when trying to focus a tube.

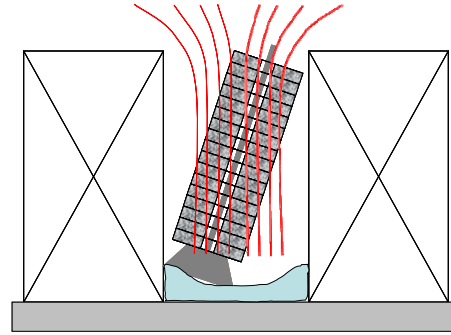
The following variations will be performed and analyzed:

1. Charge magnets that are nicely aligned in center of solenoid and test in tube
2. Charge magnets that are poorly aligned and test in tube
3. Charge magnets that are poorly aligned, knockdown at worst angle, and test in tube.
4. Slice magnets at different angles to study the extremes of non-axially forces, and test in tube

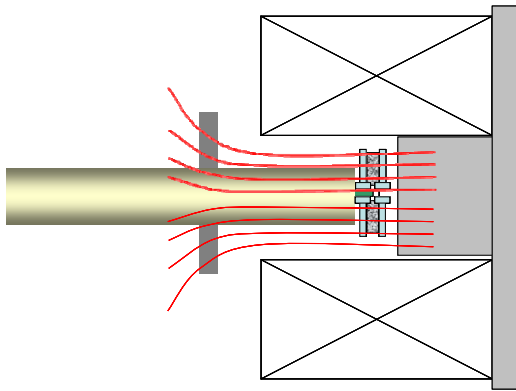
SEMICON BULK CHARGING STATION LAYOUT



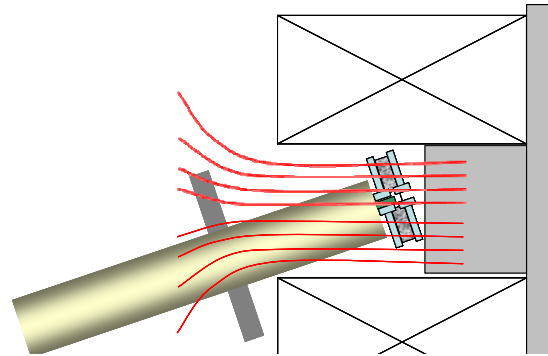
TILT COMBINED WITH SOLENOID END EFFECTS



SEMICON SINGLE CHARGING STATION



TILT (EXAGGERATED) IN SINGLE CHARGING STATION



### Non Perpendicular Slicing Angle

