

**250MSA RESULFURIZED
HIGH GREEN STRENGTH STEEL POWDER**

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ABSTRACT

P/M technologies have eliminated or greatly minimized the necessity for the machining process and developed the ability to produce complex near net shape. However, due to the limitations in the process, some secondary machining operations may still be required, for instance, drilling holes in a horizontal direction, adding threads, or developing tighter dimensional tolerances. Kobe Steel, Ltd. has introduced several grades of resulfurized steel powders containing manganese and sulfur allowing improved machinability. Kobe Steel, Ltd. has also developed a special resulfurized powder featuring higher green strength characteristics. This article describes general characteristics and machinability properties of 250MSA as compared to conventional resulfurized powder and powders containing manganese sulfide powder.

INTRODUCTION

Machining cost as a portion of the total P/M fabrication cost are significant. Increasing machinability, therefore, can significantly affect the cost of the finished product. Factors affecting machinability include the hardness of the matrix and the residual porosity of the material. Manganese sulfide powder is widely used in the P/M industry to improve machinability. One drawback to the use of manganese sulfide is that the sulfurate gas generated during the sintering process damages the sintering furnace. To prevent this, Kobe Steel Ltd. has developed a resulfurized steel powder. The newly developed powder, 250MSA, has the manganese and sulfur pre-alloyed with the steel powder.

Compactibility of steel powder is another important characteristics in the manufacture of P/M products. Unless the powder has satisfactory compactibility, problems such as chipping of the green compact sharp edges or cracking at the junction of a horizontal flange and vertical hub are likely to occur during the compacting process. Kobe Steel Ltd. has developed the atomization and annealing processes required to enhance green strength material and overcome these problems.

Resulfurized 250MSA has been developed through the combination of conventional resulfurized powder