Porosity

From the inception of Casting Technology, the efforts are ON to make the casting Porosity free. Porosity means there will be gaps, discontinuities on the surface as well as inside the casting, which result into leakages under pressure in a working environment (harsh stringent conditions regarding corrosive gasses/high pressure applications at elevated temperature etc). Simulation as main tool in foundry technology & Fluid dynamics experience have helped the industry to reduce the porosity more significantly to control the location of porosity. In short today the experienced die caster can produce castings with controlled porosity limits in non-critical areas for majority of its components. To understand this subject in depth lets concentrate on the types of porosity and the causes of the same.

- **Gas Porosity**

Gas porosity is present in random location and can vary its position in subsequent castings. The identification of gas porosity is simple; round bubbles is how one can describe them in the cast piece.

- **Flow Porosity**

Flow porosity is generated when two separate metal flows come together. If the cooling of the liquid metal is advanced then some times the metal flows will not meet and there will be a void. There will be sharp edges seen in the X-Ray in this case.

Some times there can be gas porosity coming on the edge of two flows and it can be classified as both flow and gas porosity.

- **Shrink Porosity**

As casting starts solidifying, it starts pulling in the metal from hottest structure and finally creating a void or hollowness at the center. By providing proper cooling channels where mass of the casting is high, this problem can be eliminated.

The porosity can be controlled first by identifying the type of porosity and then analyzing the causes. In case of flow porosity, maintaining adequate die temperature in particular zones like molten metal entry point into the die and in some times higher intensification pressure will resolve the problem. In case of gas porosity, maintaining metal purity during melting, adequate degassing and more systematic analysis of the gate & overflow design are the thumb rules. It is highly skillful subject and experience of the die designer in similar product technologies are the most important factors coupled with analysis based on simulation. If porosity is inevitable in particular areas then it is pushed out through additional overflows, which do not form a part of casting. Porosity also plays major role for a leak proof casting.