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Influence of mold oscillation during solidification on grain size, degree of grain refinement and tensile properties of the A356 and A319 aluminum alloys

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A356 and A319 aluminum alloys were cast under stationary and oscillation condition. The frequency range selected was 0 Hz to 400 Hz with constant amplitude of 15 μm . It has been observed on the basis of experimental results that intensity of oscillation, in general enhances mechanical properties such as ultimate tensile strength, yield strength and percentage elongation of casting along with reduction of grain size of $\alpha\text{-Al}$. The mechanical and metallurgical properties are appreciably improved at a higher frequency of oscillation. This may be due to the increase in number of nucleation sites because of fracturing of grains due to oscillation. Rapid ejection of heat of molten metal takes place due to mold oscillation at interface during solidification. This brings about grain refinement and modification of eutectic cells in casting.

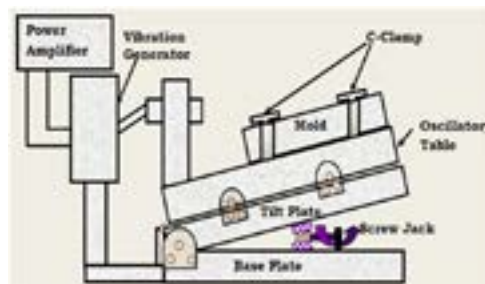


Figure 1: Schematic Diagram of the Set-Up

Recent Publications

1. Sakendra Kumar and S P Tewari (2017) Metallurgical and mechanical characterization of A319 aluminum alloy casting solidified under mould oscillation. International Journal of Metal Casting ISSN: 1939-5981.
2. Sakendra Kumar, S P Tewari (2017) Effect of mold oscillation on the metallurgical characterization and mechanical properties of A319 aluminum alloy casting. International Journal of Cast Metals Research ISSN: 1364-0461.
3. Kumar S and Tewari S P (2016) Evaluation of microstructure of A356 aluminum alloy casting prepared under vibratory conditions during the solidification. Sādhana ISSN: 0256-2499.
4. Jyoti Prakash, S P Tewari, Bipin Kumar Srivastava (2014) Effect of longitudinal weld pool oscillation (LWPO) on mechanical properties of AA 6101 T6 aluminium alloy welds. International Journal of Advanced Research in Engineering & Technology (IJARET) ISSN 0976-6499.
5. Tewari S P and Rathore Nitin (2010) Resistance spot weldability of low carbon and HSLA steels. Thammasat International Journal Science 15(1):1-11.

Biography

S P Tewari has his expertise in casting and welding area. He is having approximately 37 years of teaching and research experience in the area of casting and welding. He has published more than 60 research papers in international and national journals. He has authored six books in the field of manufacturing and production engineering. His extensive work is in the area of mold oscillation and weld pool oscillation which bring about grain refinement and ultimately leads to the enhancement of mechanical properties of casting and weldments respectively.

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