Optifine is a highly potent TiBAl grain refiner marketed by MQP. It has been shown in several industrial trials, and more recently in full casthouse production (1), that targeted levels of grain refinement in a range of aluminium alloys can be achieved at far lower addition rates than is needed for conventional TiBAl grain refiners.

**Lower addition rates**

For instance, addition rates of over 0.4 kg per tonne up to 1.0 kg per tonne are routinely used with conventional TiBAl grain refiners to obtain the level of grain refining needed to avoid ingot cracking in many alloys. Optifine has however been proven to achieve the same result with addition rates as low as 0.1 kg per tonne or even less.

Throughout the aluminium industry, TiBAl grain refiners in the form of 9.5 to 9.7 mm rod in coils, are added to molten aluminium alloys by means of specialised feeding machines. These single strand machines are designed to operate at a range of speeds which will deliver TiBAl rod at a rate as low as 10 cm per minute (equivalent to an addition rate of 0.24 kg per tonne for a 5 tonne/hr metal flow) and up to a maximum of 600 cm per minute with an accuracy of +/- 3%. Other speed ranges can be provided on request.

The specially designed, single strand rod feeder, which will be marketed by MQP as Optifeeder, uniquely has the concept of a shaft encoder fitted to the geared motor to provide a speed reference. It also has a second shaft encoder on the drive top feed roll to provide the actual rod speed. This concept is illustrated in the picture.

The Optifeeder control panel will provide speed control using an inverter configured for encoder feedback. An Allen Bradley PLC will be incorporated with a touch screen HMI display for operator convenience. A high speed counter within the PLC will provide an independent display of actual rod feed rate.

Summing up, MQP believes that when Optifine is used in conjunction with the Opticast system to optimise the addition level and thereby minimise the cost of grain refinement, it is especially important to know precisely the amount of Optifine rod being added. The Optifeeder Rod Feeder machine, due to its unique mode of rod speed measurement, offers a highly accurate rod addition as well as the facility to conveniently monitor and store information relating to all Optifine treated casts.

**Reader Reply No.171**

**References**