

The micro MDU - a need converted into reality

Introduction

The use of Degassing units in Aluminium Foundries prevails at present in most developed countries, but in developing countries, there is still a lag in the number of units in operation.

The reason for reduced usage is both one of cost and the lack of a suitably sized unit to replace the use of degassing tablets.

The design and manufacture of a unit of this type was considered a prime objective for FOSECO MEXICO.

We considered a typical small size aluminium foundry, and checked their consumption of tablets from previous years. From this study it was clear that any small foundry would only consider equipment in which they could recover their cost in less than 2 years.

Development

As degassing tablets became more environmentally unacceptable, and legislation in Mexico regulates the use of this type of technology, FOSECO MEXICO decided to search for an innovation that would allow FOSECO to maintain its presence in the degassing market for small aluminium foundries. This new innovation (either material, equipment or system) needed to be commercially acceptable in order to maintain our presence in this market.

A number of ideas were considered, and after a lot of thought, Jose Luis Figueroa (National M&T Manager), Jorge Diaz (NFMT M&T Manager) and Rafael Daryanani (CEO), considered that the most viable and profitable option would be to create a new MDU unit at a reasonable cost, in which ongoing business would be the sale of the consumables. The project was named: Micro MDU* (μ MDU).

At a reasonable cost, the equipment included security devices for safe operation, and speed control. Extras could be added as required, that may be useful to specific customers, depending on their needs. This new equipment at a price 4 to 6 times (when considering worldwide current prices) less than its bigger counterparts (FDU, MDU) permits the smaller foundries to justify its purchase, and to change its degassing process.

The equipment was developed and tested in 6 months, as Foseco Mexico already had experience in the manufacture and design of MDU and FDU* units over the last 5 years. The equipment was launched during the Mexico Foundry Association (SMF) Congress held in Saltillo in May 2000, and



Figure 1: μ MDU unit, shown in the Mexico Foundry Association (SMF) Congress in Saltillo, May 2000

the first unit sold days after that event (see figure 1). At present Foseco Inc, is testing similar equipment in Cleveland, in order to consider adding it to its range of machines.

The Micro MDU (μ MDU), was constructed considering the smaller foundries' needs and for ease of operation. The unit, operates on crucibles, ladles and / or furnaces, where melting, refining and modifying processes take place; and where a degassing treatment is required. The unique advantage, is that the unit is adaptable and quickly and easily handled.

The main interest of Foseco with the potential user is to understand their degassing process and adapt Foseco's μ MDU to that environment. As an example, we verified the process at a customer using a lance degassing process, where initially the treatment time was 12 minutes (see figure 2). When trialing with the μ MDU (see figure 3), we were able to reduce the time to 5 minutes, and improve the degassing efficiency for the alloy (see figure 4). Many similar cases are being considered at present.

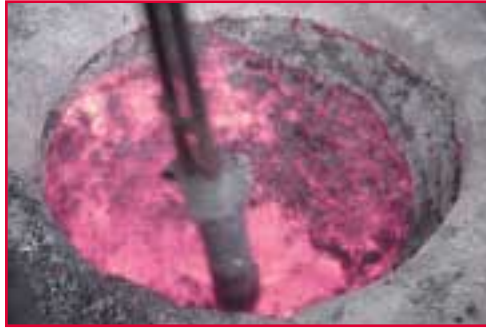


Figure 2: Lance Degassing Method.

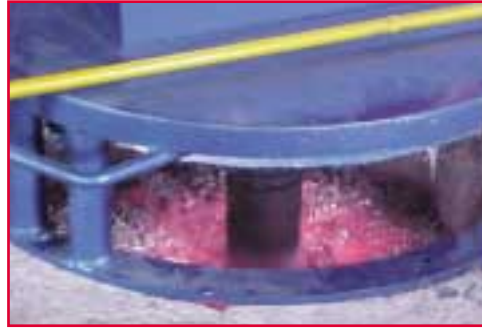


Figure 3: Degassing process with the μ MDU.



Figure 4: Results before and after using the μ MDU.

Operational Characteristics / Types

The μ MDU is an equipment that is easy to operate. The control unit shows clearly all the parameters to control the process of the degassing treatment, such as pressure, flow, time and r.p.m.

In order to satisfy different requirements from a variety of foundries, a number of units can be offered with added refinements as required, these are classified as follows:

μ MDU S100

Equipment provided with the necessary parameters to control flow, time and r.p.m.

μ MDU S200

The only difference with the S100 series, is that the present model is provided with a sound signal and a flash – light / end cycle alarm.

μ MDU L150

This is the deluxe design, provided with all the control parameters specified, plus a yellow beacon for end cycle with siren.

All the units mentioned have insulation to protect the equipment from heat radiation and a security sensor (if the equipment is lifted during the process, the unit will shut down instantly).

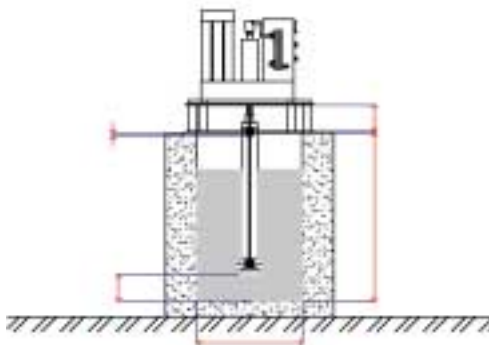


Figure 5: Arrangement of a typical μ MDU during degassing.

The general construction specifications for the μ MDU are:

Metal treatment capacity	220 – 770 pounds
Standard motor	Electrical D.C. motor, 1 H.P.
Process control	Digital electronic timer (semi-automatic) & potentiometer for speed control. Tachometer with display & flowmeter for speed control. Flowmeter, 0 – 30 liters/min. Control gauge pressure Yellow beacon for end cycle with Siren
Time	
R.P.M.	
Flow	
Pressure	Control gauge pressure
Cycle	
Electrical Supply	110 V.A.C., 50/60 Hz
Rising System* (Specified by Customer)	Manual / Hand Operated Fork – lift truck Hoisting Block
Control cabinet	Metal cabinet
Graphite shaft (the length of this consumable may vary)	18" & 22" (length), 3" Ø
Graphite rotor (recommended)	5" Ø
Equipment weight	165 Lb (approx.) (depending on design)

Advantages

- Robustly built
- Light weight, easily carried in the foundry (approx wt of 165 pounds).
- Insulated to protect component from radiation from the molten metal.
- Common components for different types of machines for ease of maintenance.
- Simple controls from cabinet.
- Safe operational conditions for the operator.

Conclusions

The foundry market in Mexico is becoming ever more sophisticated, hence the need to introduce innovative solutions in order to overcome problems.

One such problem, as discussed, is the trend to move away from degassing tablet technology toward systems which offer at least the same degassing efficiency without any potentially negative environmental side-effects. This will create a need for units such as the μ MDU to resolve this technically and at a commercially acceptable cost.