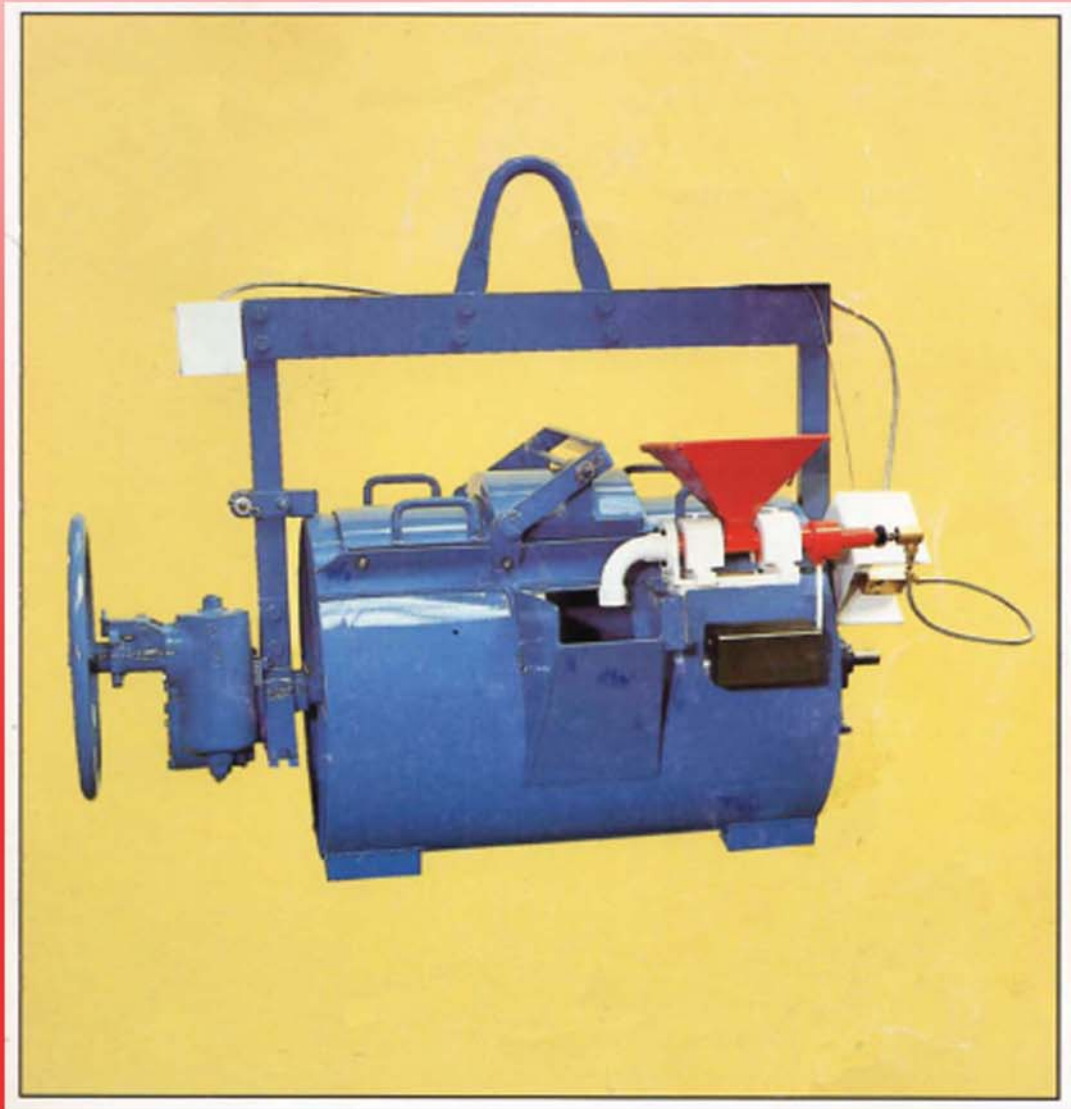


PARADAY Ltd

MICRO-SEEDER



**CONTINUOUS STREAM INOCULATION
SYSTEM FOR LADLES**

WHY STREAM INOCULATE?

1. Stream inoculation provides more powerful chill reduction than ladle inoculation, and does so using considerably less inoculant.

This is important for thinner casting sections prone to chill, and allows a cost saving as well.

2. Ladle inoculation effectiveness fades with time. This means that casting quality is changing with time throughout the pouring of several moulds from one ladle. Nodule counts, hardness, chill tendency etc., vary from the start to end of each ladle due to inoculation fade. Stream inoculation eliminates these variations thus providing more uniform iron properties of all castings throughout each pour.
3. Continuous stream inoculation is also considered preferable to cast-to-shape inoculant inserts for several reasons:-
 - (i) inserts are far more costly to buy than continuous stream inoculant powders such as "Superseed".
 - (ii) Inserts are also more costly to use due to the labour to verify insert weights, to site them into moulds and to verify presence before mould closing.
 - (iii) Inserts have been reported to sometimes result in undissolved insert pieces being washed into the castings.
 - (iv) Inserts frequently have high aluminium levels.

For several years continuous stream inoculation has been used in conjunction with autopour furnaces.

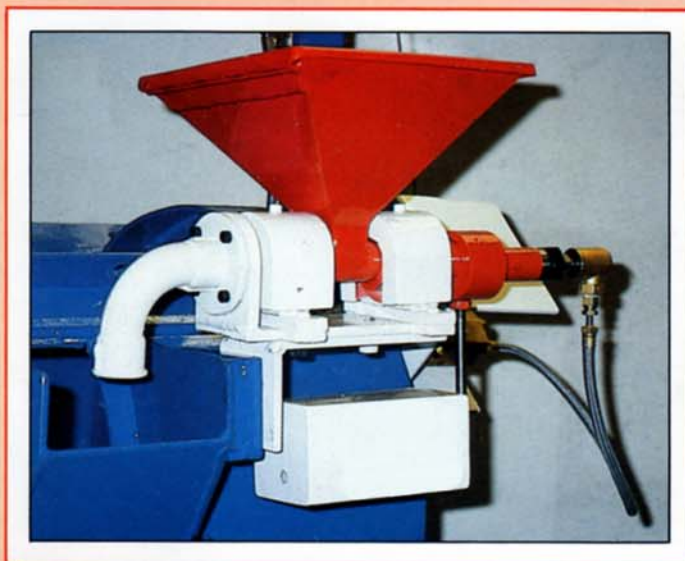
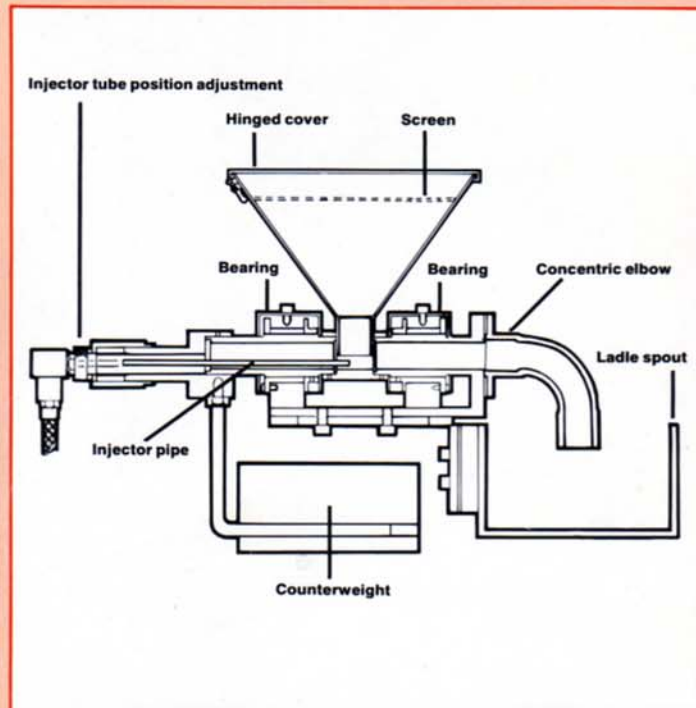
Now this powerful technology is finally available for iron poured from ladles.

PARADAY Ltd
MICRO-SEEDER

HOW DOES "MICRO-SEEDER" FUNCTION?

The "MICRO-SEEDER" framework attaches to the spout of the ladle. Superseed powder charged to the alloy hopper falls by gravity through a slot below the hopper. When the gas flow is turned on, the powder in front of the injector tube is blown down the length of the dispenser and to the iron stream. Flow rates are controlled by the injector tube position and/or gas pressure.

Since the dispenser is mounted to a ladle spout which rotates during pouring, and the dispenser must remain upright; the dispenser hopper and "mainpipe" are mounted on bearings and are maintained vertical by a counterweight.



In order to keep the Superseed flow directed at the metal stream during rotation, a concentrically mounted discharge pipe is used which revolves around the mainpipe during ladle tilting.

The net result is that Superseed powder is fed at a steady controlled flow rate toward the casting stream through the pour, even while the ladle is rotating.

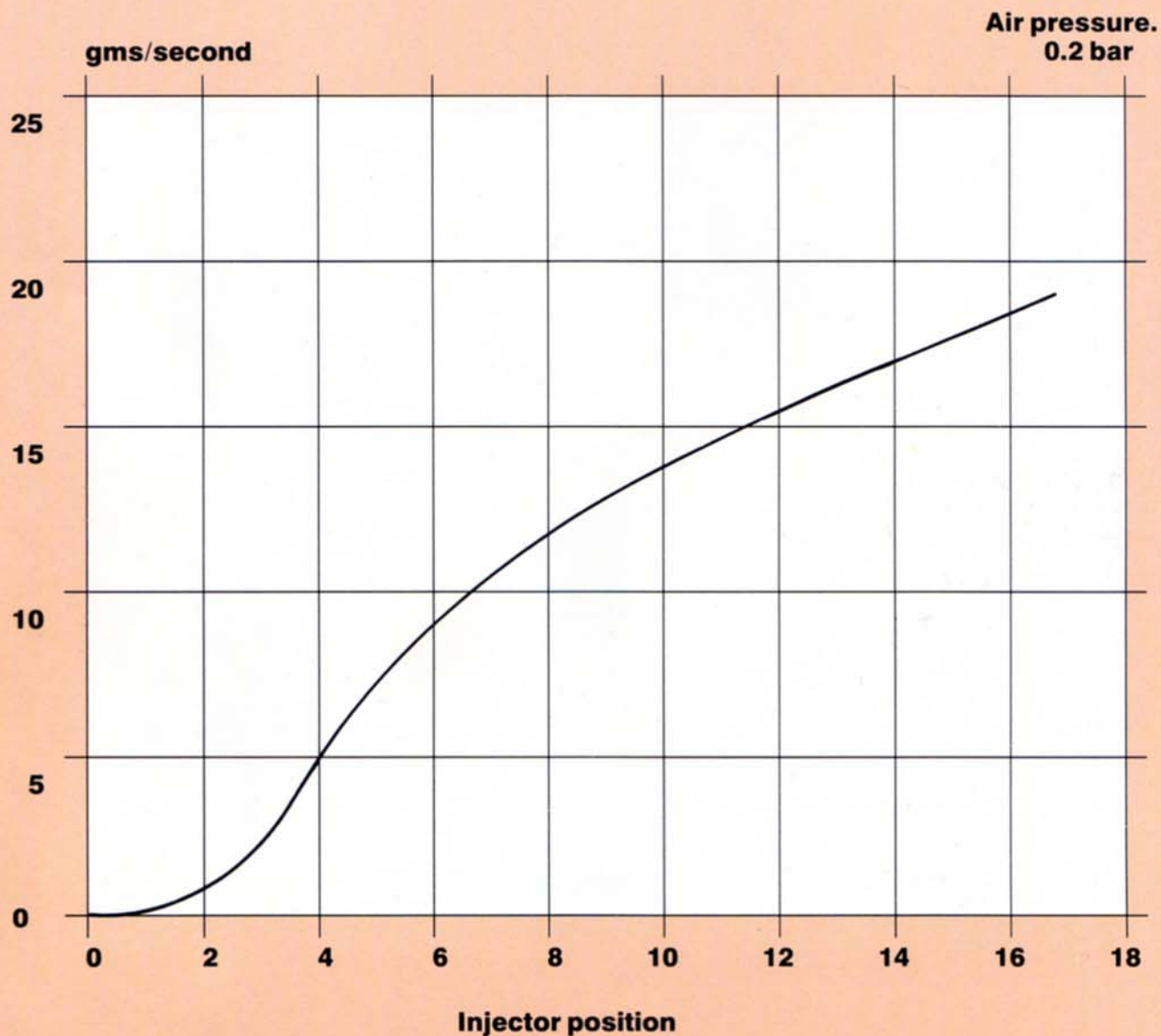
FLOW RATE RANGES & ACCURACY

The following graph was compiled from a calibration test with a "MICRO-SEEDER".

At 0.2 bar operating pressure, Superseed flows can be adjusted from about 1/2g/sec to about 20g/sec.

Standard deviations are about 10% of the flow rate. Mini-Seeder dispenses a wide range of flow rates with excellent precision.

*Flow rates may be altered as required by altering the gas pressure as well.



MICRO-SEEDER (LIP AXIS MODEL)

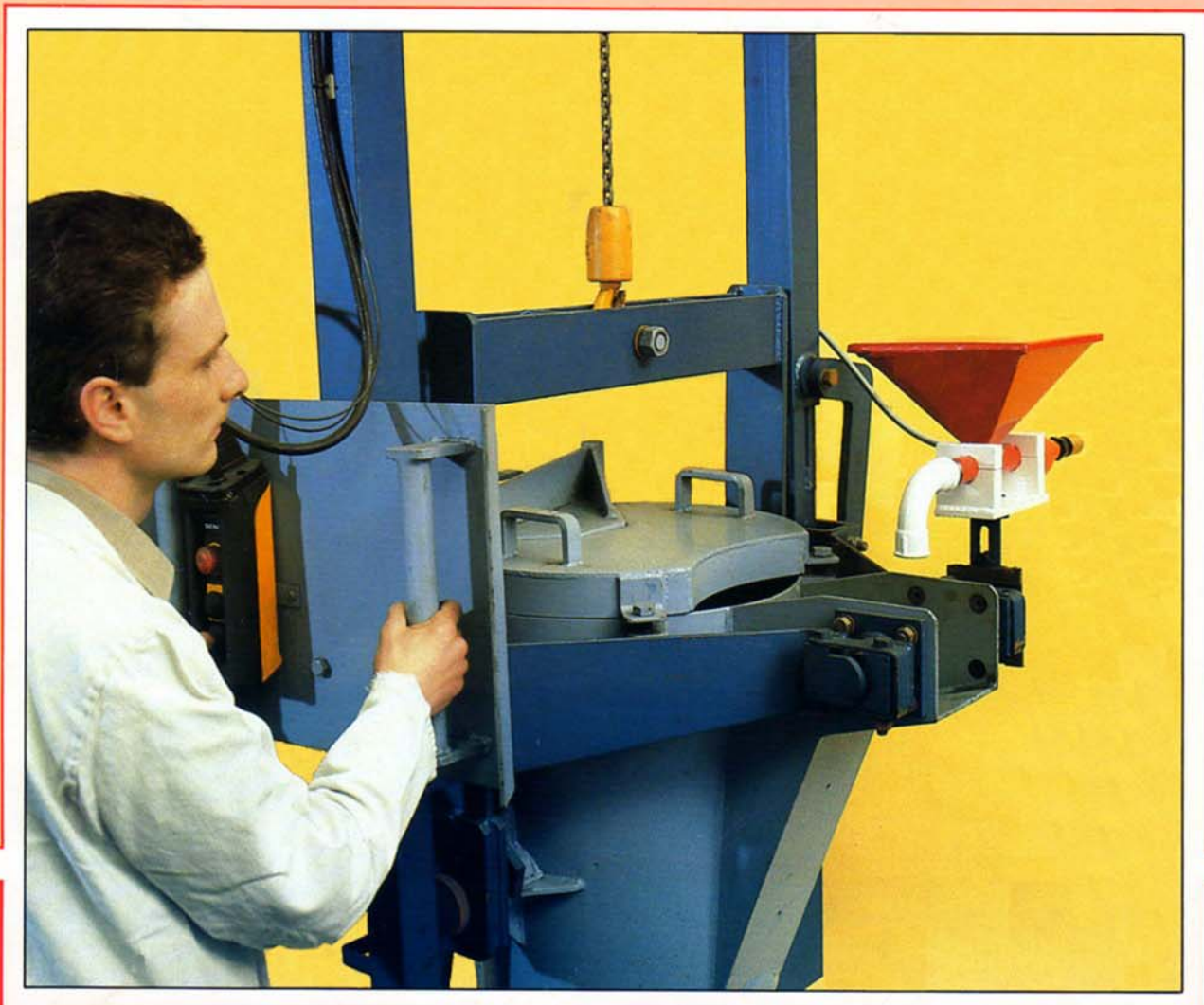
Lip axis ladles have been adopted by numerous foundries in recent years, to allow metal pouring without altering the lip or pouring spout position during the pour. It is believed that this allows the operator to do a better job.

A Micro-Seeder has been developed for these types of ladles also. In fact it is the same unit without bearings or a counterweight and is mounted to the steel framework which supports the shaft through the ladle spout. This framework does not tilt during pouring.

For this type of "Micro-Seeder" an air valve is provided which is spring loaded to remain on, unless the operator closes the valve and holds it closed.

This means that the dispenser activates automatically when the operator releases the valve lever to operate the tilt controls to pour.

Some foundries may prefer to install their own electrically operated valve, linked to the ladle tilt controls.



A lip axis model Micro-Seeder installed on a ladle.

Note how the dispenser is mounted so as not to obstruct the view of ladle lip and metal flow to the mould pouring basin, and Superseed flow can be monitored.

WHY SUPERSEED INOCULANT?

1. Superseed has been known for many years to be an exceptionally potent inoculant for chill elimination.
2. Superseed dissolves very rapidly and completely. This is believed to be due to the refined composition of Superseed which avoids Ca and Ba (Ca=0.10% max in Superseed). Other inoculants containing Ca or Ba are slower to dissolve; perhaps due to the very limited solubility of these elements in iron.
3. Superseed dissolves in iron generating a minimum of dross. Complex alloys containing high levels of numerous active elements generate more dross, especially if the elements contained have low solubilities, such as Ca and Ba. The refined nature of Superseed with low Ca (0.04% typical) and low A1 (0.30% typical – 0.5% max) combined with the single element Sr (0.9% typical) results in a very minimum of dross.

Over the years foundrymen have selected ladle inoculants largely by results from chill tests. The quantity required to obtain suitable chill reduction multiplied by the price of the inoculant dictated the economics and many foundries selected Superseed.

Later it was discovered that increased eutectic cell counts to high levels could promote shrinkage defects due to mould wall movement. More foundries again selected Superseed to help avoid shrinkage problems.

With the conversion to electric melting, numerous foundries started to resulphurize their grey iron back toward traditional cupola levels based on the observation that Superseed performance was enhanced at higher S levels in the iron.

In recent years, foundrymen have been adopting mould and stream inoculation. With paramount requirements for very rapid and complete inoculant dissolution with minimum dross formation, even more foundrymen are selecting Superseed. In fact, an ever increasing number of foundries are using Superseed for stream inoculation of S.G. iron. Clean, fast and complete solution are necessary to avoid defects!

We recommend you contact your Elkem representative to determine the correct model and size Micro-seeder for your application; as well as inoculant coordination with different types of iron.

FOR FURTHER INFORMATION CONTACT

PARADAY Ltd

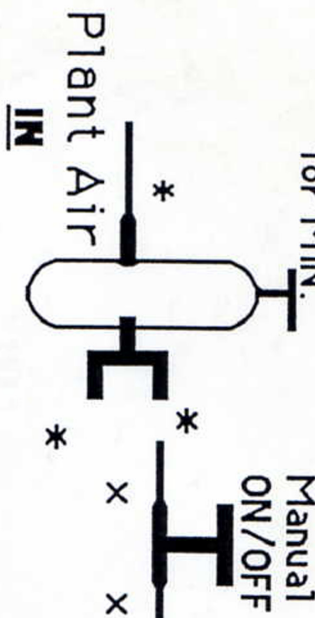
telephone +44(0)121 353 7223

e-mail sales@paraday.co.uk

Layout of Hoses and Connections.

Pressure control
anticlockwise

for MIN.



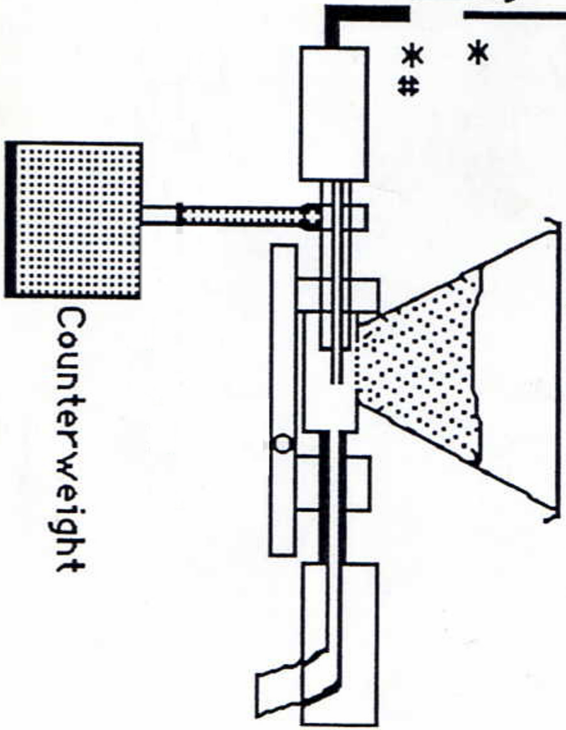
Manual
ON/OFF

Low pressure
gauge
15psi
max.



- * = quick connects
- # = restricted orifice
- X = threaded connections

Micro seeder
Dispenser



Counterweight