

Rautomead Steals the Show with new copper casting technology

wire

Düsseldorf



8-12 April 2002

Special Edition

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New Machines to be launched at Dusseldorf

RDG SERIES (see page 4)

- 20,000 tonnes per year, 8.0mm Cu-OF
- Integrated melting and casting, cathode feedstock
- Single furnace, graphite crucible technology

RFS "Rod from Scrap" SERIES (see page 1)

- 8.0mm copper rod
- 2,000 tonnes per year
- Baled wire and compressed granule feedstock

RST SERIES

- Copper strip production for electrical busbar manufacture
- Or thin strip for welded tube

Innovation and enhanced economy are the key influences behind three impressive new Rautomead

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copper & copper alloy rod and tube & strip continuous casting machines that are to be launched at Wire 2002.

First is the Rautomead RDG Series of copper rod casting machines designed to economically produce up to 20,000 tonnes output of 8.0mm diameter rod per annum. With a single integrated melting, holding and casting furnace,

operating costs are significantly reduced when compared to other systems.

Next is the RFS "Rod from Scrap" Series designed for converting high quality clean dry baled wire scraps back into 8.0mm diameter copper redraw

rod. Finally, the RST Series of integrated melting and casting machines offers continuous upwards-vertical production of copper & copper alloy rod, strip & tube products.

RAUTOMEAD INTERNATIONAL

Rod From Cathode

NEW Rod From Scrap

wire Düsseldorf
8-12 April 2002

CONTINUOUS CASTING MACHINES

Onward and Upward

The Rautomead RFS "Rod from Scrap" machine represents a novel process for the recycling of clean copper scrap to make copper redraw rod. The machine is designed as an integrated melting and casting unit, is rated at 240 KVA and is capable of melting and casting at a rate of up to 300 kg per hour on a continuous basis.

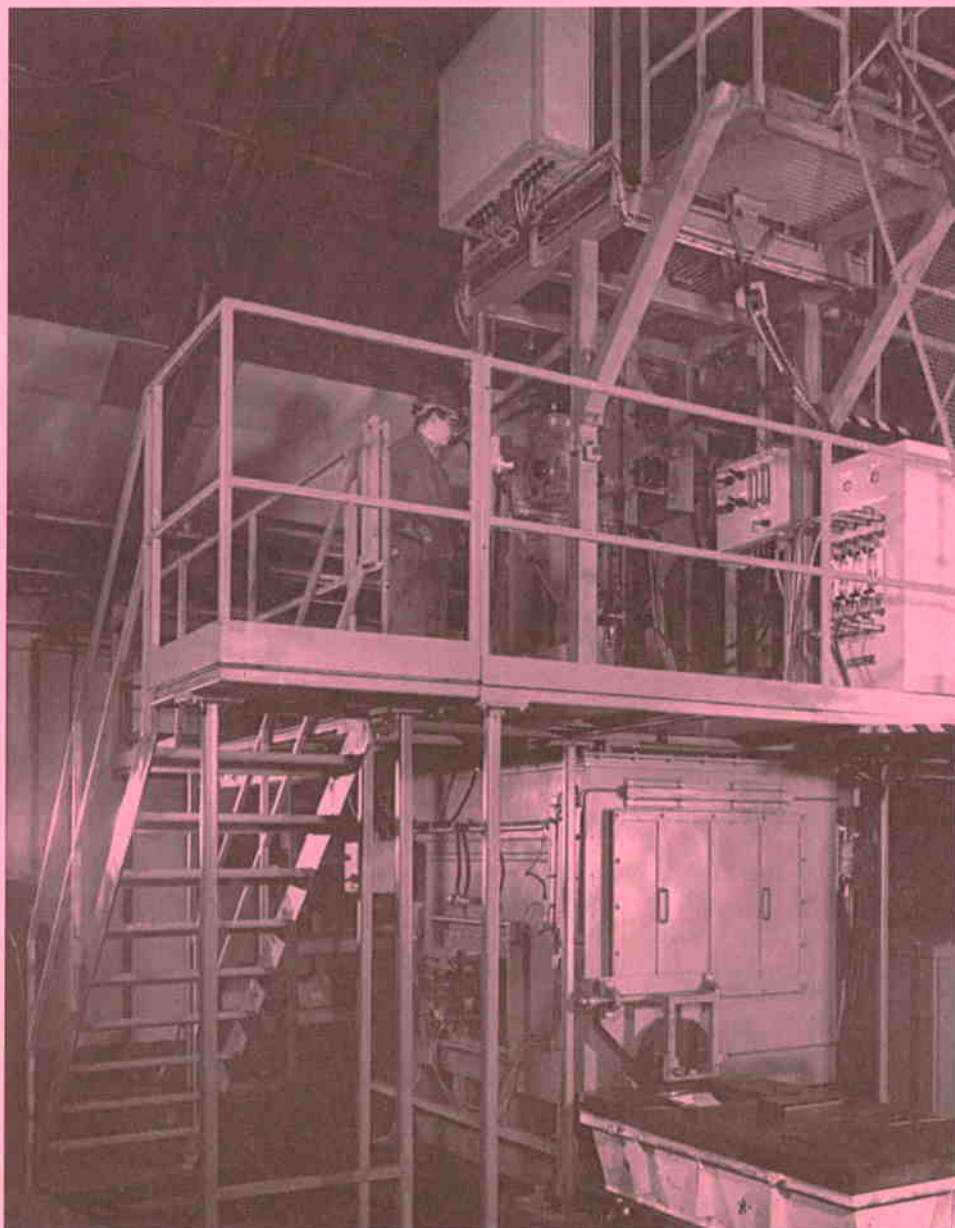
The withdrawal unit may be fitted with dies and coolers to produce three strands in the diameter range 8mm to 12.7mm. Casting speed depends on product sizes and number of strands. Typically, in production of 8mm rod, the machine will produce three strands at 3.6 metres/minute. Rods are coiled in conventional Rautomead rod coilers. Rod coil weight is up to 4 tonnes.

Feedstock from scrap

Clean mill scrap in the form of baled wire or briquetted granulated scrap may be used as feedstock. This may also be blended with a proportion of grade A cathode conforming to BS 6017 - 1981 (1989) Cu-CATH-1. Best results, however, are obtained when the scrap is compacted to around 6.5 gm/cc or more.

Electrical Resistance Heating

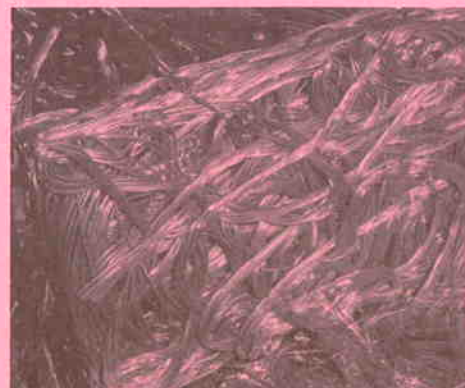
The RFS Series uses an electric resistance-heated twin chamber graphite crucible furnace, comprising a robust fabricated steel shell, mounted on a channel section base frame. This is built up internally from a refractory brick base,



4000kgs rod coiler

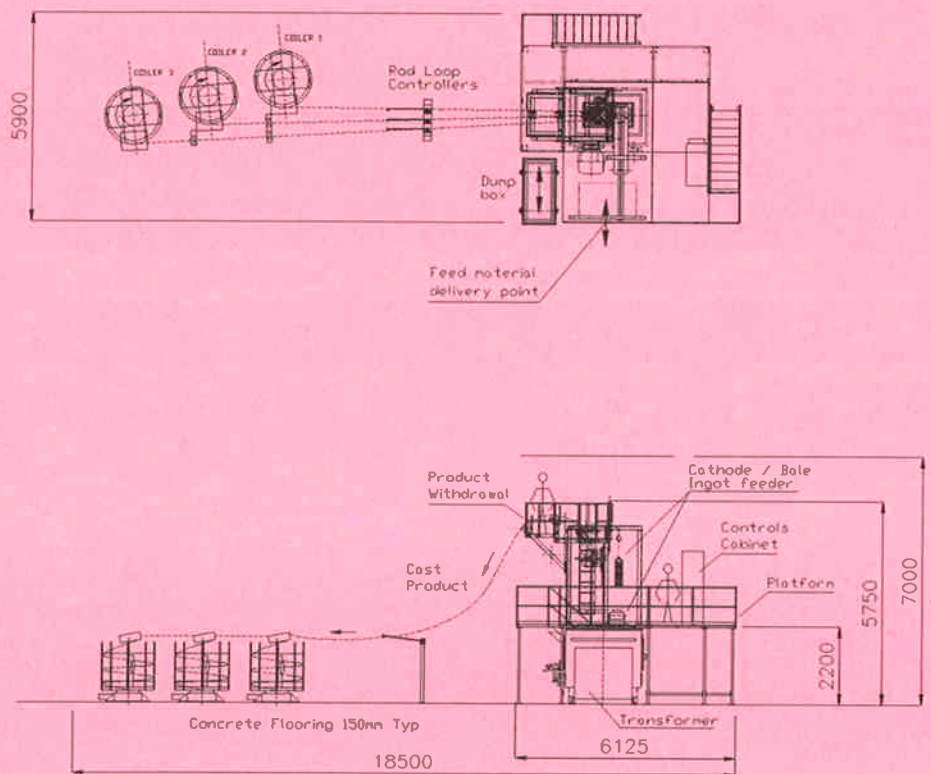
using specially selected refractory and insulation materials.

The interior of the furnace forms a sealed unit, which is purged with inert gas for protection of the graphite crucible and resistance heating element chain that surrounds it. The rear power terminals and secondary power terminals are water-cooled. Side doors are removable for



Clean copper wire scrap

Rod From Scrap - The New RFS Copper Casting Machine



Floor plan of RFS machine

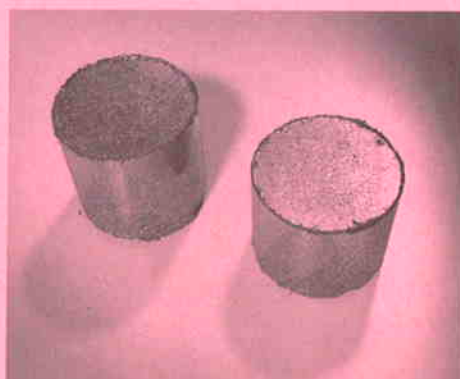
maintenance attention and a taphole for drainage of the crucible in case of emergency and for regular inspection is provided at one side. Crucible capacity is approx. 2,000 kg, giving a molten metal dwell time of 5 to 6 hours for conditioning and oxygen reduction.

Casting Die Assemblies and Product Withdrawal

The casting dies are mounted on a carriage, which is arranged to move up and down and thus to maintain a constant immersion depth of the graphite casting dies in the molten metal. Product withdrawal is by twin driven rolls and pneumatically clamped rear pinch rolls, using a mechanical indexer drive.

Ease of operation

Furnace and casting temperature is automatically controlled and all key production parameters are automatically



Briquetted granular copper scrap

monitored and alarmed. One operator is required to feed the machine, to monitor production and change coils as required.

In-built efficiencies

RFS machines are designed for continuous production over long periods. Continuous operation will normally be the most efficient manner of running. However, where it is preferred to shut down over week-ends, the dies

The New RFS Series In Focus

• Feedstock

Clean dry copper wire and granulated scraps, free from plastic, moisture and metallic impurities

• Output

Three strands of 8.0mm diameter rod at 240 - 300 kg/hr.

• Casting die life

Approx. 6 tonnes when processing 100% clean scrap, increasing to approx. 12 tonnes for 100% cathode.

• Conductivity

Conductivity of the "as cast" 8.0mm diameter rod is directly related to feedstock quality, proportions of scrap and cathode. Tests indicate 95% to over 100% IACS.

• Oxygen Content

Nominal 200 ppm in scrap. Oxygen content in cast wire rod 8.0mm, measured at less than 10-15 ppm when using 100% baled wire scraps and briquetted granule scraps.

• Drawing of 8.0mm "rod from scrap"

Sample coils of 8.0mm diameter copper rod, produced using 100% scrap feedstock (60% baled wire, 35% briquetted granules, 5% loose granules) were cast at 80 kg/hr.

can be withdrawn from the melt, lids closed and the temperature reduced to "standby mode", with the metal remaining in the crucible for quick resumption of production.

Minimised Operating Costs

Careful attention has been given to minimising running costs of the RFS machine. The principal cost is electrical power. In continuous operation, the machine can be expected to use approx. 450 kWh per tonne produced. This includes the power required for melting and casting, as well as other ancillary services.

Space Requirements

The RFS machine is 5.9 metres wide by 11.7 metres long (incl. coilers) and requires headroom of approx. 6.5 metres. A normal 150mm reinforced concrete floor is sufficient and no pits or other special foundations are required.