

Rautomead  
Quick Die Change Patent awarded  
APPROVED

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### **Rautomead Quick Die Change Technology Receives European Patent**

**Continuous casting technology specialists, Rautomead Limited, of Dundee, UK, have been granted a European patent in respect of their recently introduced Quick Die Change (QDC) technology for their range of horizontal continuous casting machines.**

Available on new Rautomead RT 650 and RT 850 horizontal casting models, and as a retrofit opportunity on most Rautomead continuous casting machinery already in service, QDC technology enables casting dies to be changed without first cooling the furnace. This reduces typical die change time from around thirty hours to about one hour, with 20% to 40% improvement in operating efficiency according to the length of each casting campaign.

Comments Rautomead Managing Director, Brian Frame, "Quick Die Change is a significant advancement in continuous casting technology, one that offers considerable time-saving benefits to users and further underlines Rautomead's position as a leading provider of continuous casting equipment."

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### **Most significant engineering step to-date**

“Rautomead has been building graphite-furnace-based horizontal continuous casting machines for the production of bronze, nickel-silver and brass alloys for over twenty-five years,” he continued. “Although designs have evolved over that time as a result of continuing programmes of product improvement and in response to customer needs, Quick Die Change is by far the most significant engineering step to date in improving the up-time performance of this equipment. With the reassurance of a European Patent to protect the innovation, we have the confidence to continue our investment effort in the research and development of future technological advancements that will benefit Rautomead customers.”

### **Stability, strength and metallurgical cleanliness**

Rautomead machines operate at temperatures from around 1,000 deg C to 1350 deg C, according to the alloys in production. Hallmarks of Rautomead furnace designs have been the use of a graphite containment system for the molten metal, electric resistance heating and inert gas protection of the internal hot working components of the machines. Advantages of the use of graphite crucibles include the stability, strength and metallurgical cleanliness of the material at these elevated temperatures. Customers also have experience of eight and ten years' typical service life from a single crucible in these machines.

Nevertheless, graphite erodes quickly in air at such high temperatures and, for that reason, it has until now been necessary to cool the machine down to change the casting dies to avoid internal damage to the furnace.

### **Non-graphitic protective sleeve**

With QDC technology, a non-graphitic protective sleeve is used between the casting die assembly and the other internal hot working components of the machine, enabling the casting die to be changed immediately the molten metal has been cast out. The new system is already in use at two Rautomead customer sites.

Typical example of efficiencies to be gained by using Rautomead QDC technology

**Criteria:**

Working days per year	322	Days
Working hours per day	24	Hours
Casting campaign	10	Days
Time to cool down & change dies – <u>traditional</u>	30	Hours
Time to change dies – <u>QDC</u>	1	Hour

**Comparison:**

	<b>Traditional System</b>	<b>QDC</b>
Production campaigns/year	$322/12.25$ = 26.29	$322/10.04$ = 32.07
Productive days/year	$26.29 \times 10$ = 262.9	$32.07 \times 10$ = 320.7
Increase in efficiency		$320.7/262.9$ = + 22%

**Over 40% increase in efficiency**

In casting campaigns involving more aggressive alloys, where die life may only be five days, the increase in efficiency using QDC is over 40%.

An added technical advantage of the new QDC technology is the avoidance of regular thermal cycling of the casting machine, thus greatly reducing the inherent stresses borne by the equipment in such a pattern of operation.

In terms of operating cost, not only is there substantial extra productive time available, but energy, labour and inert gas costs in re-heating the machine between die changes are all eliminated.

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Schematics of the old and new Rautomead technology:

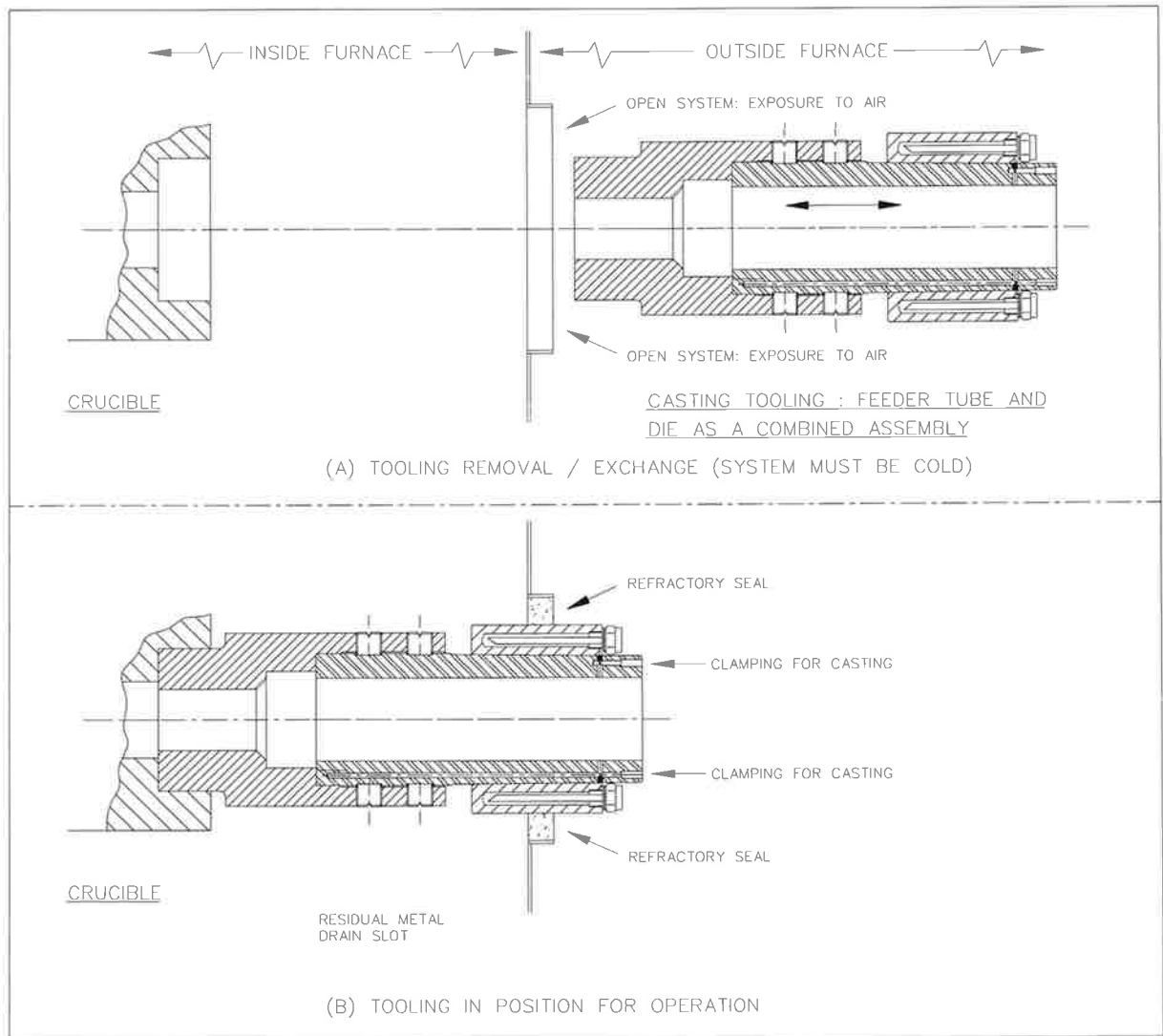
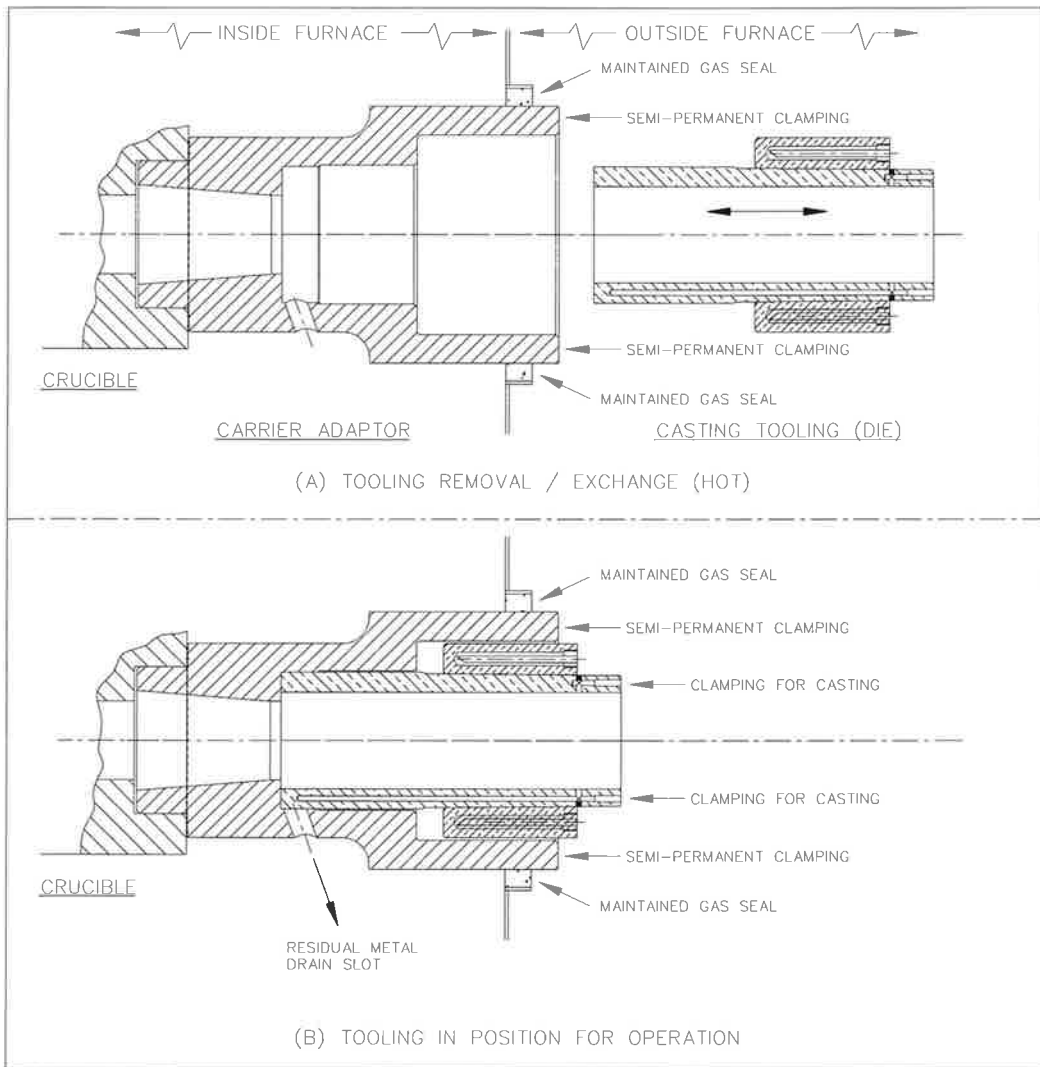


Figure 1 - Key features of the conventional Rautomead Continuous Casting system. Changing of dies normally conducted only when the furnace is cold.



**Figure 2 - Key features of the patented Quick Die Change system for changing Continuous Casting tooling when system is hot to minimise downtime.**

