



# NEW MOULD RELEASE AGENT REDUCES FIRE AND ENVIRONMENTAL RISKS



Author: Enrique Pardo, Foseco, Spain

Due to concerns about the fire safety and environmental performance of existing petroleum-based green sand mould release agents, Foseco has developed the PARTISAL\* 477 ECO family of release agents. These cost-effective, non-toxic agents deliver improved flammability resistance, while maintaining performance standards in terms of release efficiency, ease of application, and lubrication of (vertical) moulding machine components.

## INTRODUCTION

Green sand moulding lines lie at the heart of the foundry: any delays, breakdowns, or damage here has the potential to cause significant disruption to foundry production. As a result, the use of release agents has become common in both horizontal and vertical green sand mould systems.

Applied between the mould and the pattern, mould release agents improve the ease and speed with which the mould can be removed from the pattern. They also help improve the quality of the mould, and thus reduce the incidence of mould-related casting defects.

Mould release agents have traditionally been manufactured from low-quality oils recovered during the refining process. For the most part, these petroleum-based products offer a low-cost and effective solution. But they are not without challenges, notably when it comes to their safety and environmental performance.

As a result, foundries were looking for a new type of moulding release agent that solved these issues. This paper will discuss the resulting development of PARTISAL 477 ECO to meet these enhanced demands.

## THE NEED FOR A SAFER, CLEANER RELEASE AGENT

Many traditional release agents for moulds are classified as harmful, toxic, or dangerous under recent changes to EU legislation on base oils and organic additives. This poses a challenge for many companies that are pursuing a more environmentally-aware purchasing strategy.



Figure 1: Typical pictograms in old formulations



Figure 2: PARTISAL 477 ECO without any classification

These release agents also have relatively low flashpoints and have been responsible for a number of fires at foundries in recent years. These incidents have led to foundries reviewing and reinforcing their safety systems with technical measures and products that provide greater protection against the risk of fire.

After hearing from several different foundries with both horizontal and vertical green moulding lines, as well as suppliers of moulding machine, the Foseco development team concluded that there was a market need for a new family of mould release agents that would offer improved environmental and fire safety performance.

PARTISAL477 ECO release agents tick both of these boxes, being both non-hazardous (they are similar to food-grade lubricants) and having a high flashpoint.



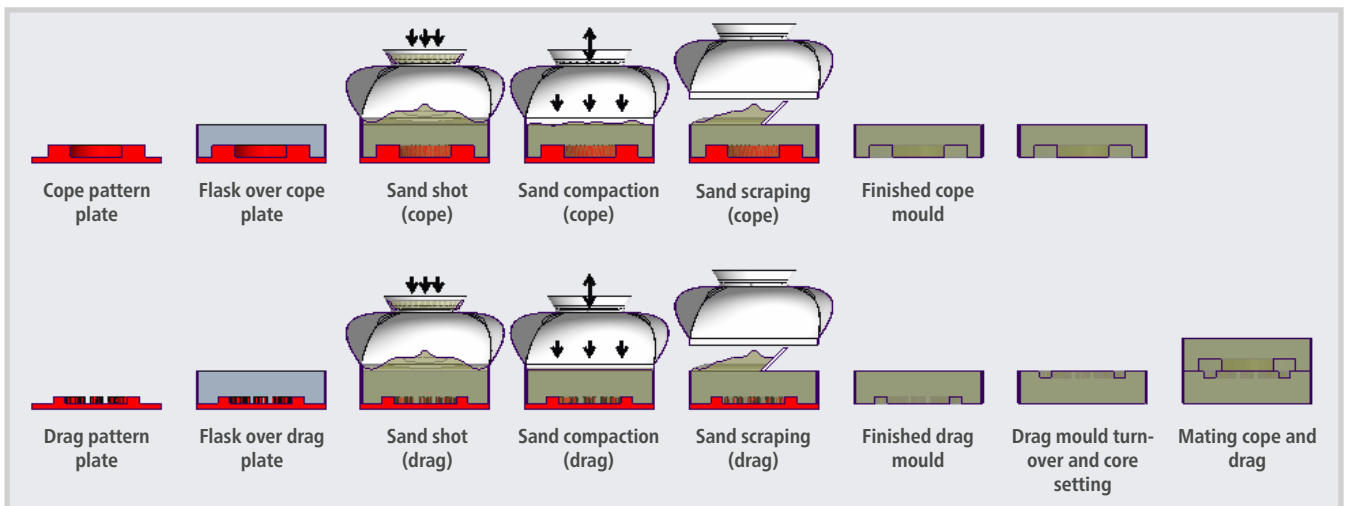


Figure 3. Horizontal sand moulding principle

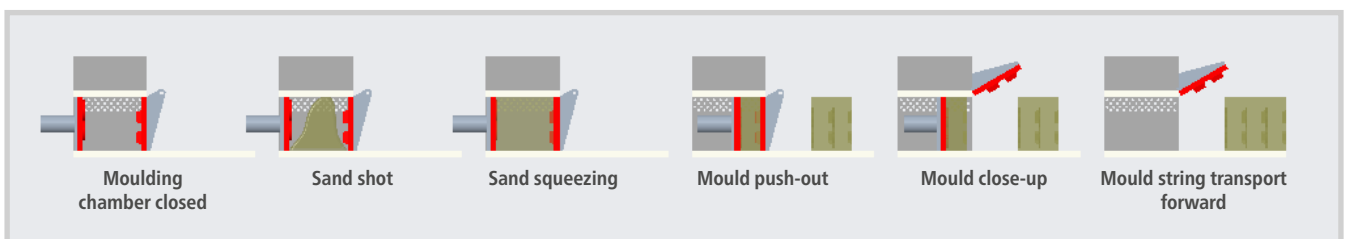


Figure 4. Vertical sand moulding principle

However, any new release agent must also at least match the basic functionality of traditional oil-based products in terms of release efficiency and ease of application. In these areas too, PARTISAL 477 ECO has been formulated to deliver highly-effective performance. And it had to fulfil all these requirements, while also delivering on cost.

## RELEASE EFFICIENCY

Release efficiency is key to productivity and surface quality of moulds – and thus the castings they produce. However, green sand moulds have a greater tendency to break during release because the plasticity of the green sand is fairly low. A range of factors, such as the temperature of the sand, and mixing of the sand with bentonite and water, can reduce that plasticity still further. At the same time, the geometry of moulds is becoming increasingly more complex, further complicating release.

Additionally, the application of a release agent between the pattern and the greensand mould can significantly improve release efficiency and reduce rejection due to mould breakage by more than 10%. During the development of PARTISAL 477 ECO, Foseco therefore investigated a range of different oily bases and additives with hydrophobic and surface-active properties in order to ensure the new offering met the standards required for release efficiency.



PARTISAL 477 ECO application on horizontal moulding line



PARTISAL 477 ECO application on vertical moulding line

## EASE OF APPLICATION

If the use of a release agent is essential, so too is how that release agent is applied. If the application of the release agent is too thin, the protective film will not be created and the risk that the green sand mould will stick to the pattern will increase. The same is also true if the release agent is applied too thickly.

PARTISAL 477 ECO was developed to facilitate application using spray equipment to create a fine, homogenous film. Foseco also experimented with different types of spray equipment and nozzles to ensure good projection. The company's technical department is able to provide advice on the start-up of this equipment and ideal application pressures.



Figure 5: Very easy atomisation of PARTISAL 477 ECO

## LUBRICANT EFFECT

A final important demand from both the manufacturers of green sand moulding lines and foundry maintenance teams relates to the lubricating effect that release agents can provide. This is particularly relevant in vertical moulding line. This helps to reduce wear of the mechanical components of the vertical moulding machine, improving component life, reducing maintenance requirements, and improving uptime of the machine.

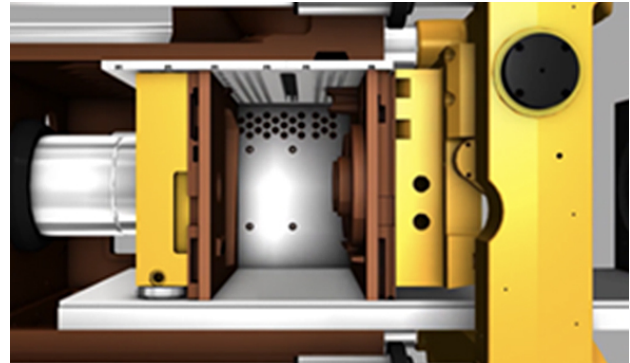


Figure 6: PARTISAL provides a release effect in the mold formation chamber

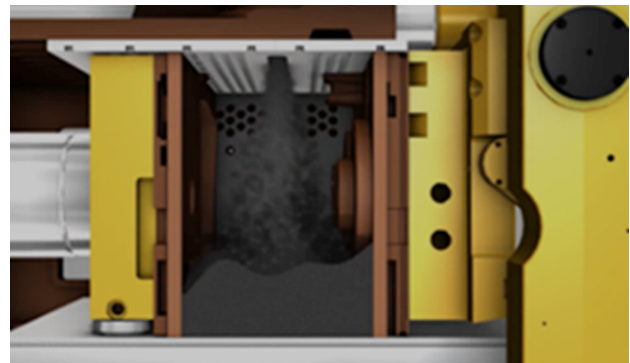


Figure 7: PARTISAL provides a lubricant effect on mobile equipment and work bed

## SUMMARY

Foseco has developed the PARTISAL 477 ECO release agent that firmly meets the demands of both green sand casting foundries and manufacturers of those casting lines.

- Environmentally-improved product with a clean safety material safety data sheet.
- High flash point, reducing the risk of fire on green sand mould production lines.
- High de-moulding efficiency: it creates a homogeneous film with high release properties.
- Easy application: no clogging, good atomization for greater application efficiency.
- High lubricating power, which helps extend the life of moving parts.
- Competitive price.

## ABOUT THE AUTHOR

Enrique has been with Foseco for 35 years and is currently Technical Director Iberia. In this role he is responsible for the development and application of our products in Spain and Portugal. He is also responsible for the supervision and monitoring of the Spanish manufacturing plants. It's a job where no two days are the same and it's never boring. In his free time, Enrique is passionate about sport, especially surfing. He also enjoys discovering new cultures through travel and reading.

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click on the icon to get to his profile



enrique.pardo@vesuvius.com



**ENRIQUE PARDO**  
Technical Director Iberia

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