



Innovative casthouse solutions

Featuring our flagship product:

Optifine™

The next dimension in grain refinement





Aluminium is our business...

... and one of the most efficient materials.

At MQP, there's little we don't know about this extraordinary, highly-recyclable and lightweight metal.

And with experience spanning decades, we are proudly one of the world's leading suppliers to the aluminium industry today.

Through our Optifine grain refiner and Opticast testing technology, we are helping casthouses worldwide meet demand for higher internal and surface quality in slabs and billets from ever more discerning customers.

We also offer other specialist equipment to improve overall casthouse operations.



The casthouse dilemma:
“Casting is good one day,
bad the next. But we haven’t
changed anything.”



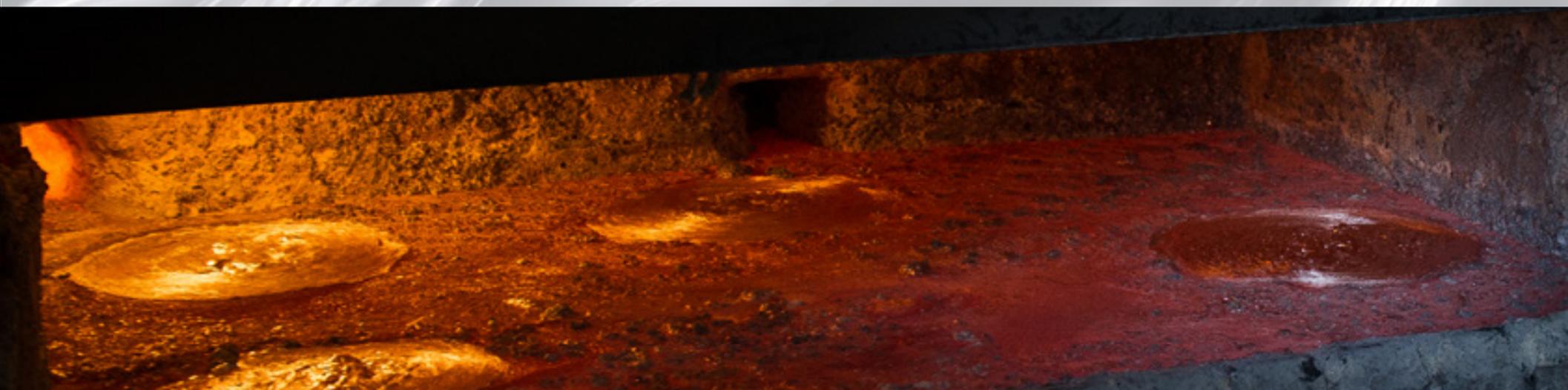
This has to be the most common complaint from casthouses and inconsistency of grain refiner can play a big part, leading to increased cracking, inconsistent or large grain size and impairment of melt quality.

To ensure the very best quality products, aluminium melts must be grain refined to prevent cracks and achieve the required grain size.

Grain refiner, ultimately, contains particles that act as substrates on which grains will nucleate when the liquid metal is solidifying.

But there is well-documented inconsistency of grain refiners, resulting in scrapped charges, product downgrades and higher processing costs.

At MQP, we have spent 20 years working on an innovative solution that would change this for customers around the world.



Introducing...

The next dimension in grain refinement:

Optifine, our powerful TiBAI grain refiner, consistently cuts addition rates in a wide range of aluminium alloy compositions by up to 85%.

Crucially, as casthouses only need to use a third of the amount of standard TiBAI grain refiners typically used, Optifine can bring costs down by half.

Optifine is making such an impact, it is now routinely used in 42 major casthouses worldwide to produce over three million tonnes of alloys a year.

Whether you are producing chassis for aluminium electric vehicles, automotive body sheets, window frames, beverage cans, foil or anything else, we have an Optifine to suit you.

Every batch of Optifine is rigorously tested using our Opticast nucleation performance test to guarantee grain refining efficiency and cleanliness of the product before it arrives at your casthouse.

Manufactured using the latest casting technology at parent company STNM's state-of-the-art production facility in Baoding, China.

Optifine™



The science

Containing 3% or 5% Ti and 1% B, Optifine has the same chemical structure as any other grain refiner with this composition.

The difference is that Optifine has up to 10 times the number of active nuclei compared to that of the worst performing batches of standard grain refiner, resulting in a consistent, high efficiency as shown in independent studies.

It can directly replace any other 3:1 or 5:1 grain refiner in any type of casting application. In fact, it can replace any type of grain refiner including TiCAI. As part of the optimisation process, if growth restriction is low, it may be adjusted by controlled addition of Ti.

Crucially, every batch is tested using our Opticast performance test to ensure a minimum relative efficiency is met.



Optifine™

5:1 125

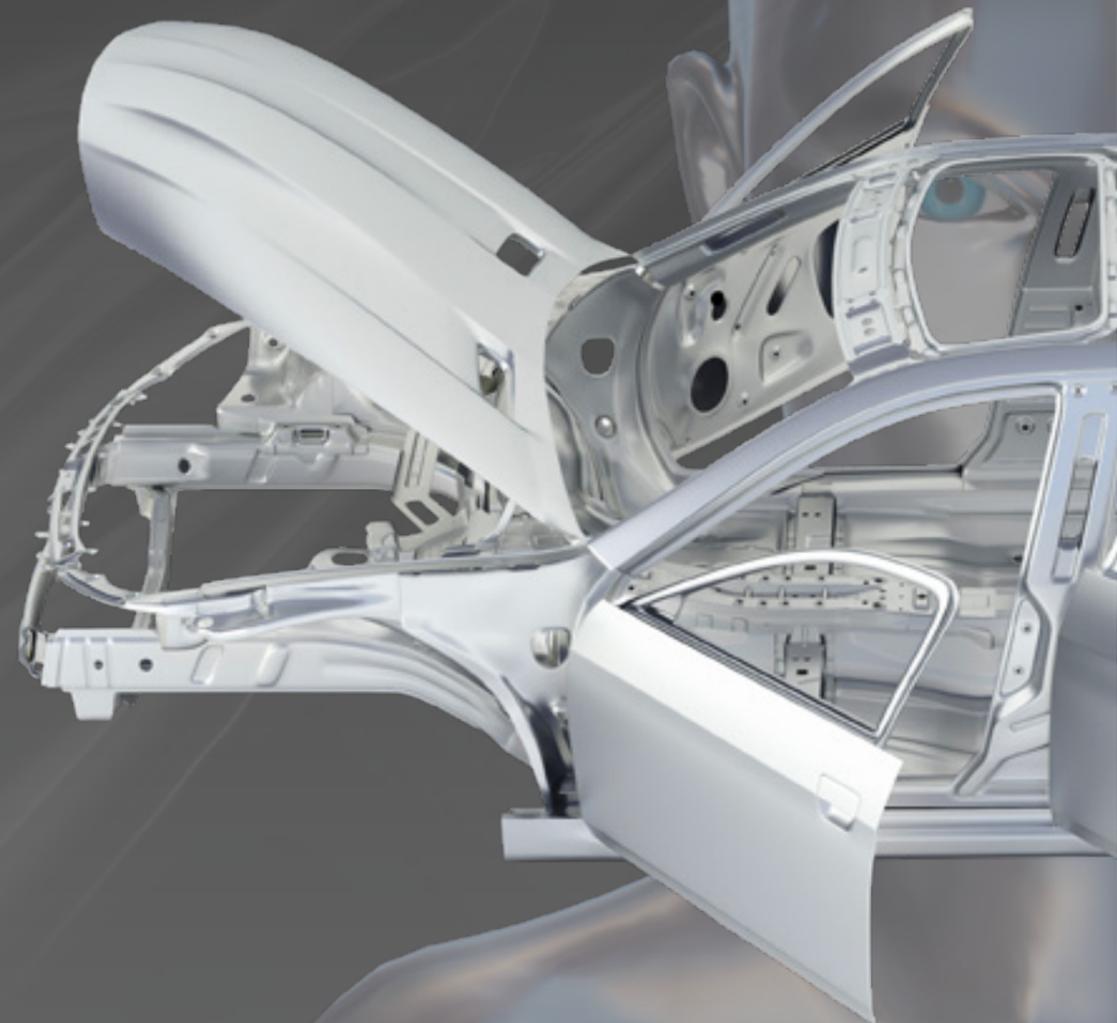
125%
relative
efficiency

Our premium grain refiner with enhanced nucleation and growth restriction offers 125% relative efficiency and means casthouses need 85% less product than standard grain refiners to consistently achieve high quality results.

Because of its ultra-low addition rate, this product is the best solution for eliminating defects in high integrity and high surface quality aluminium applications such as aerospace, automotive and electric vehicles.

One automotive extruder reported the “elimination of razors streaks” from critical, high surface quality components used in car assembly. Usually, these defects would only be detected at the end of the production process when the part was anodised - getting rid of the defects at such an early stage improved productivity in the plant.

Another client was able to successfully extrude complex engineering profiles with ultra-thin sections for the first time.



Optifine™

5:1 100

100%
relative
efficiency

Our mid-range grain refiner provides enhanced growth restriction and offers 100% relative efficiency and means casthouses need 70% less product than standard grain refiners to consistently achieve high quality results.

This product is particularly suitable for foilstock, litho sheet, canstock and packaging applications.

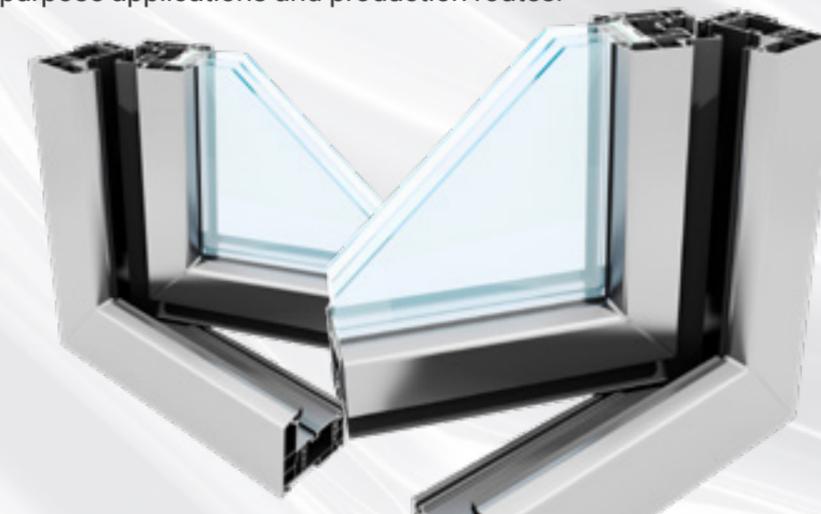


Optifine™

3:1 100

Our original, top-selling grain refiner offers 100% relative efficiency and means casthouses need 70% less product than standard grain refiners to reduce costs and improve quality in a wide range of aluminium alloys.

This product is particularly suitable for general purpose applications and production routes.



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Opticast™

As the only test of its kind in the industry, our revolutionary Opticast testing system provides a guarantee of consistency and peace of mind to casthouses as proven by more than ten years of successful application.

Ultimately, putting your grain refiner to the test using Opticast gives you the opportunity to establish the consistency of the efficiency of your grain refiner in its ability to reduce surface blemishes, cracking and defects.

Casthouses can book a test-drive at our MQP Technology Centre at BCAST at Brunel University London, and, if possible, even at your own casthouse. Get in touch for more details.

provides a
**guarantee of
consistency**

Saving you money

There are many reasons why casthouses should choose Optifine grain refiner, but the bottom line is the bottom line.

As you only need to add a third of what you would need with a standard grain refiner, it will save you a lot of money.

Typically, a large smelter or re-melt casting 300,000 tonnes per year would purchase 300 tonnes of standard grain refiner at a cost of around \$1,170,000.

By converting to Optifine, we can guarantee this operation will see their costs reduced by half - a saving of \$585,000. How much could you save by making the swap to Optifine?

50%
cost
saving

**Scan below to
find out how much
you could save**



mqp

Other casthouse solutions

Optifilter™

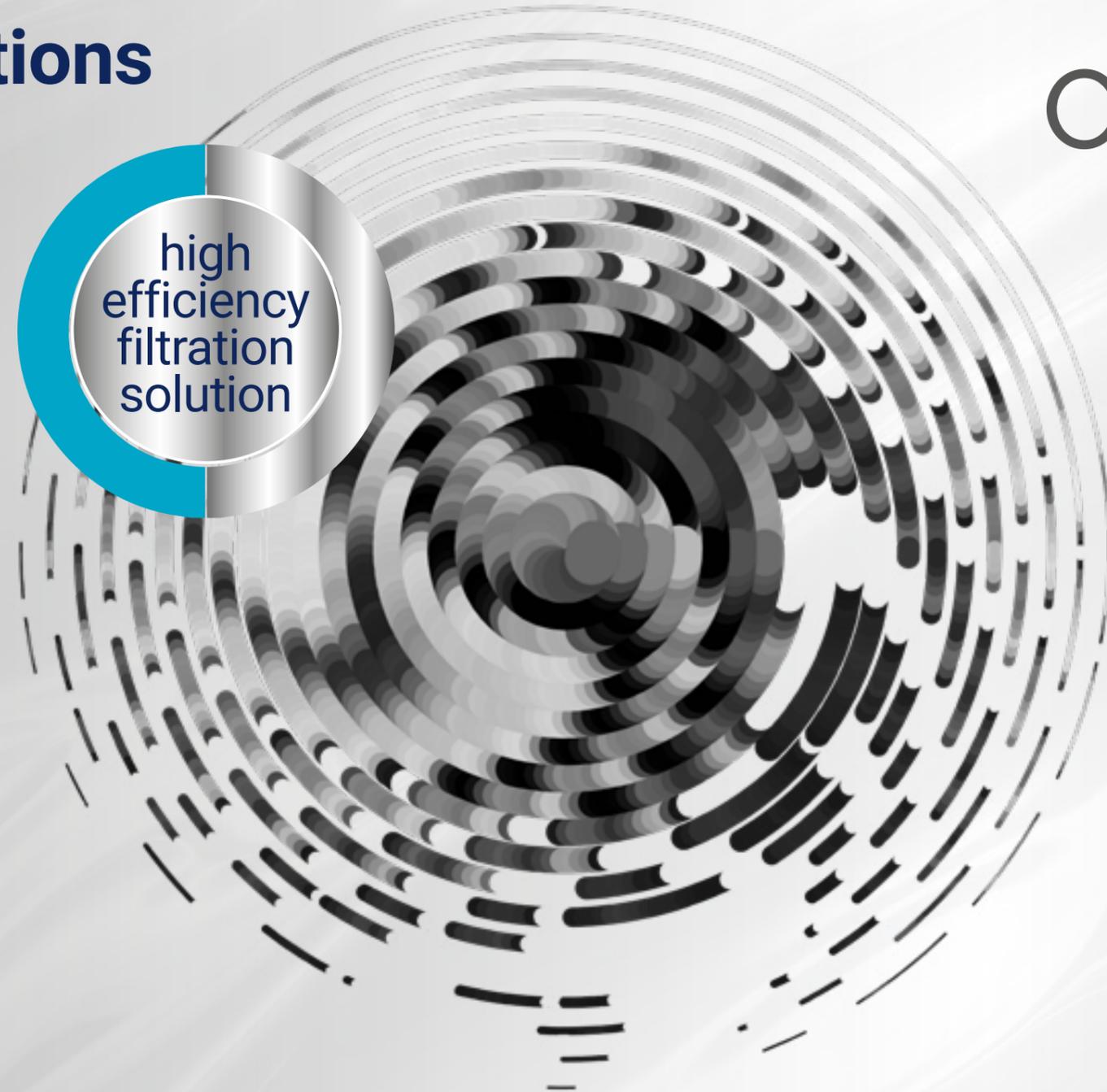
Our Optifilter filtration system is an efficient, low hold up volume filtration process for treating high flow metal rates.

This three chamber system has a ceramic foam filter as the first stage, TiBAI grain refiner added in the second stage and filtration is completed in the third stage by using an efficient cyclone.

The Optifilter system incorporating a cyclone has been proven in terms of effectiveness by:

- numerical and water modelling experiments
- prototype unit which has been used in casthouse trials and drastically reduced the number of inclusions in the melt

If eventually proven to match modelling predictions, it will provide a high efficiency filtration solution for frequent alloy changes or low volume operations.



Optifeeder™

Casthouses can improve their grain refinement process, cut costs and limit waste by adding our high precision rod feeder system to their array of melt treatment equipment.

Ensuring melts are constantly being grain refined, Optifeeder, with its series of innovative features, accurately measures the length of grain refiner rod going through the system and can be set up to alert operators when they need to change the coil – meaning far less waste.

With an encoder mounted onto the new design top roll shaft to provide feedback to the control panel, it is impossible to provide a false signal if the rod has stopped feeding. Other benefits include:

- highly efficient right-angle gearbox with a modular compact design for space-optimised assembly
- rationalised speed range and moving parts that have less wear to maximise part life
- accurate, positive non-slip feed





Reducing your carbon impact

Aluminium is at the very heart of the sustainable industrial revolution, a highly-recyclable metal with superior physical and chemical properties that can theoretically last forever.

However, elements of the production process are, undeniably, damaging to the environment, the production of grain refiner, for one.

To make one tonne of grain refiner, you need 117kg KBF_4 and 251kg K_2TiF_6 , equating to 368kg of fluoride salts per tonne or around 36,800t per year worldwide.

From this 350kg/t of $KAlF_4$, 35,000t remains as by-product which has to be disposed of, most of which finds application in fluxes for treating aluminium. From the balance, a substantial amount of F is released into the atmosphere.

If the world was to adopt Optifine, these fluoride by-products and emissions would be reduced by two thirds. And using less refiner also means less coil changes and transportation around the casthouse and lower warehouse inventory - all better for the environment.

Aluminium is at the very heart of the sustainable industrial revolution



The total CO emissions for shipping Optifine from China to the UK port is 964kg for 10MT. Shipping standard grain refiner for the same amount of aluminium production would create just under 3MT of emissions, three times more than if you use Optifine.

Pioneering research

To meet the future requirements of the global aluminium industry for ever cleaner, more efficient and cost-effective grain refiners, MQP is working on key research with Brunel Centre for Advanced Solidification Technology (BCAST).

The BCAST research group, led by Professor Fan, MQP and STNM, are leading the three-year project studying the fundamentals of nucleation.

The unprecedented research is being conducted using High Resolution Transmission Electron Microscopy (HRTEM), which allows nucleation to be studied at the atomic level. There are only four such units worldwide.

Clean and smooth surfaces of TiB_2 are observed in Optifine 5:1 125 super high efficiency grain refiner. (125%)



- Accredited with certifications including membership of the Aluminium Stewardship Initiative (ASI)
- Accreditations to ISO 9001, ISO 14001, IAF and IATF16969.
- Central warehousing in an LME accredited facility in Europe means delivery to customers is easy fast and reliable
- Strong technical service ethos and commitment to first-class customer service





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