



mqp

Optifine™

**THE NEW
DIMENSION
IN GRAIN
REFINEMENT**

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 avoid cracks and achieve the required grain size, from aerospace to automotive and beyond.

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

But the well-documented inconsistency of grain refiners on the global market has meant casthouses have struggled to eliminate cracking and maintain the same grain size in the melt every time.

This has resulted 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.



IMPROVE METAL QUALITY

SAVE MONEY

GRAIN ADVANTAGE

ALUMINIUM IS OUR BUSINESS

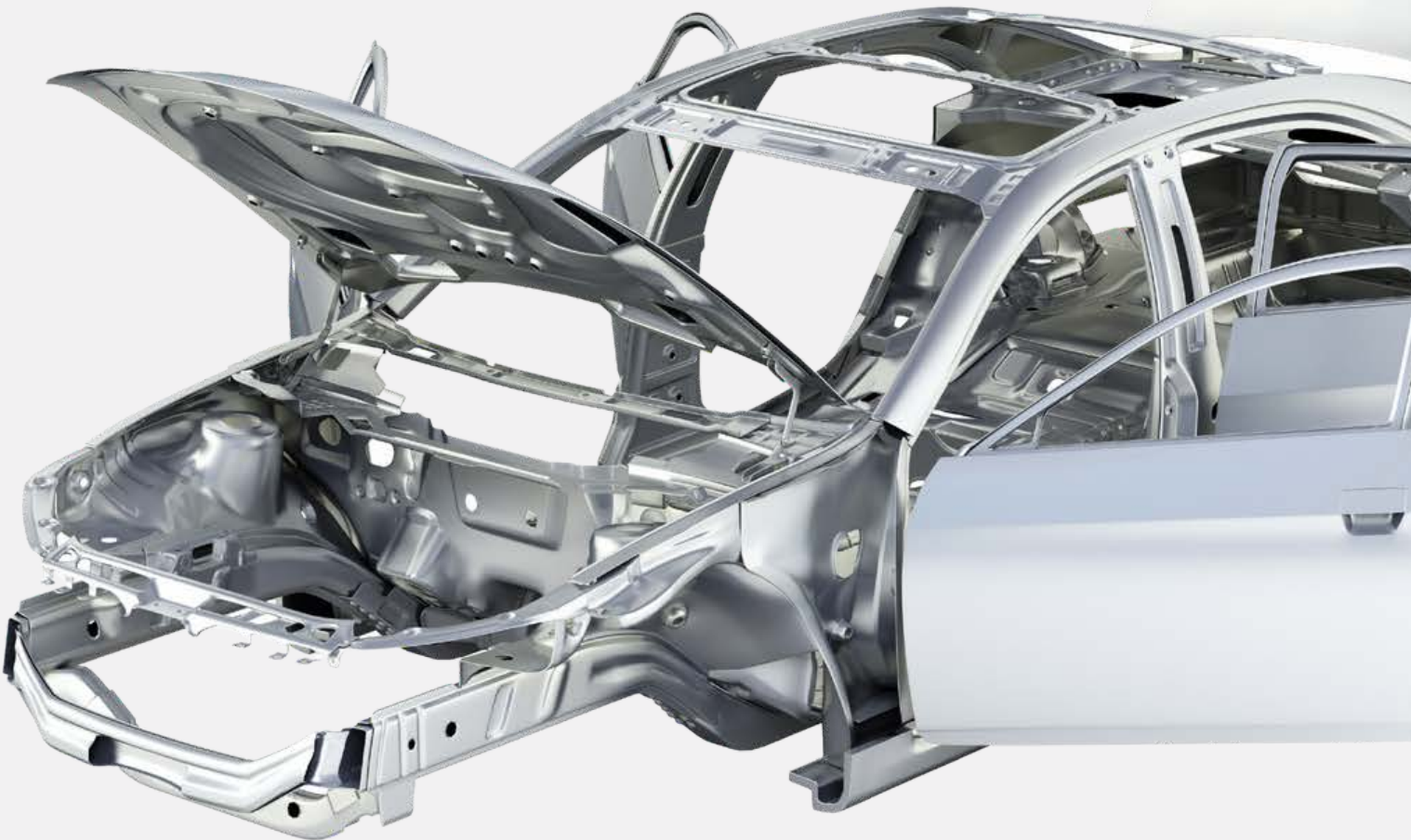
*Aluminium has come to
the fore as one of the
most efficient materials.*

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.

But what makes Optifine so special?



IMPROVE METAL QUALITY

SAVE MONEY

GRAIN ADVANTAGE

OPTIFINE - CRACKING THE CASE



Optifine, our powerful TiBAL grain refiner, consistently cuts addition rates in a wide range of aluminium alloy compositions by 70%.

And we are currently introducing a new, even more powerful product, Optifine 5:1 125, that can increase the rate of reduction to up to 85%.

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

Optifine is making such an impact, it is now in routine usage in 34 major casthouses worldwide and has been successfully used to produce more than 16 million tonnes of aluminium in the last 10 years.



Optifine™

>> MANUFACTURED USING
THE LATEST CASTING
TECHNOLOGY AT PARENT
COMPANY STNM'S STATE-OF-
THE-ART PRODUCTION
FACILITY IN BAODING, CHINA.

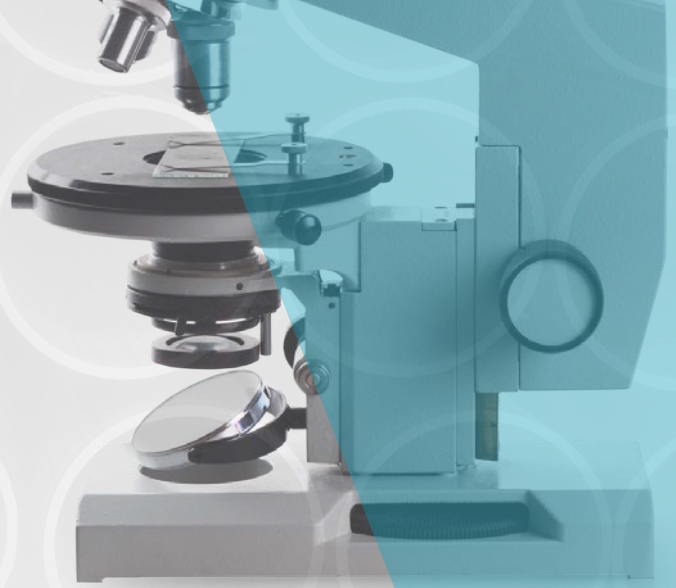


IMPROVE METAL QUALITY

SAVE MONEY

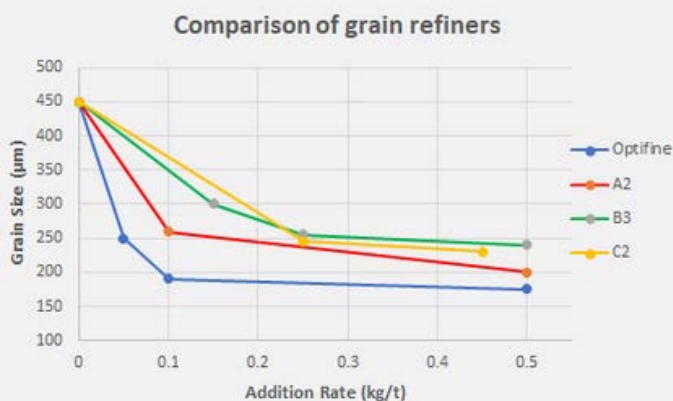
GRAIN ADVANTAGE

BACKING UP THE DATA



Containing 3% Ti and 1% B, Optifine has the same composition 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 to that of the worst performing batches of standard grain refiner, resulting in a consistent, high efficiency as shown in independent studies.



CASE STUDY: The table above compares several alloys from a re-melt casthouse producing more than 250,000 of rolling slab per year

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 that contains Ti and B. 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. As the only test of its kind, it provides a guarantee of consistency and peace of mind to casthouses as proven by more than ten years of successful application.

CUSTOMER SUCCESS

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

Another customer was able to supply a previously unattainable section of the packaging market, leading to higher sales volume for the casthouse. A third was able to successfully extrude complex engineering profiles with ultra-thin sections for the first time.



LET'S DRINK TO SAVING YOU MONEY

>> SEE HOW MUCH
YOU COULD SAVE
WITH OUR WEBSITE
CALCULATOR
WWW.MQPLTD.COM

*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 \$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?



IMPROVE METAL QUALITY

SAVE MONEY

GRAIN ADVANTAGE

REDUCE YOUR CARBON FOOTPRINT



Aluminium is at the very heart of the sustainable industrial revolution, a 'green', highly-recyclable metal with superior physical and chemical properties that can technically 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 of grain refiner produced, or around 36,800t consumed 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_2 is ultimately released into the atmosphere.

>> GREENER INGREDIENT

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.



>> CASE STUDY

Kuehne + Nagel International

The total CO_2 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.

SUPPORTING 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) at Brunel University London.

The collaboration follows BCAST's discovery that one of the key requirements for effective grain refinement is the presence of a monoatomic layer of Al_3Ti on the surface of TiB_2 particles in the grain refiner.

Optifine™

» Accredited with certifications including membership of the Aluminium Stewardship Initiative (ASI) and 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.

The BCAST research group, led by Professor Fan, MQP and STNM, have entered into a three-year project studying the fundamentals of nucleation.

Knowledge gained from the first year's work has already helped create MQP's new super grain refiner, Optifine 5:1 125, in which 90% of TiB_2 particles are coated with the Al_3Ti layer. By comparison, a standard grain refiner with only 50% efficiency contained less than 20% of coated TiB_2 particles.

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 in existence worldwide.

The ultimate aim is to make Optifine's efficiency even higher - helping casthouses improve metal quality, save money and reduce their carbon footprint.

» Every batch undergoes rigorous quality inspection in laboratories in Europe using our Opticast performance test. Only batches that pass are approved as Optifine.

» Strong technical service ethos and commitment to first-class customer service.



HOW CAN WE SUPPORT YOUR CASTHOUSE OPERATIONS?

IMPROVE METAL QUALITY

SAVE MONEY

GRAIN ADVANTAGE



Optifine™

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