



MASTER YOUR METALLURGY

Measure your Melt,
Unlock Casting Excellence

- Accurate measurement for grain refinement and modification.
- Prevent scrap period. Avoid scraps on already developed castings.
- Validate and control the raw material. No bad surprise!
- Real-life fraction solid curve for better simulation and modeling.
- Easy in-house calibration. No need of special alloy.

SF **FOUNDRY SOLUTIONS**
& *Metallurgical Services Inc.*

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SF **Thermal**
A **Analysis**

MEASURE YOUR SOLIDIFICATION

Unlock Casting Excellence

OPERATOR INTERFACE

Before
Treatment

Liquidus 616.72

Modification 1

Grain Refinement



Liquidus 616.25

Modification 5

Grain Refinement

After
Treatment



BENEFITS OF GRAIN REFINEMENT

- Uniform solidification & casting properties
- Reduce defects caused by porosities and shrinkage

Take Control of Grain Refinement with SFTA;

- Verify Grain Refinement level before casting
- Optimize Grain Refiner usage for desired results
- Determine appropriate treatment intervals

EUTECTIC MODIFICATION

Strontium modification is vital for transforming the eutectic structure of Al-Si alloys from acicular to fibrous. However, the use of pre-modified ingots introduces variability in strontium (or sodium), impacting mechanical properties and porosity in casting.

A foundry switched from pre-modified ingots to in-house melt treatment using thermal analysis. Lower and accurate strontium resulted in remarkable improvements of **30%** in elongation and **15%** in yield strength. The foundry achieved independence from suppliers, ensuring consistent quality in their casting production.

Advantages of using SFTA to control modification;

- Target lower strontium to minimize the drawback
- Control the modification treatment
- Adjust the melt process
- Consistent mechanical properties

HOT TEARING

Aluminum alloys such as Al-Cu, Al-Zn and Al-Mg are prone to hot tearing. Moreover, they tend to have lower castability than Al-Si (356).

The grain refinement is one way to minimize this tendency. However, the traditional thermal analysis systems were not capable of measuring it because there have rarely liquidus undercooling. SFTA is capable of measuring it thanks to its superior accuracy by using the cooling rate curve.

SOLID FRACTION CURVE

- Measure your true solid fraction curve
- Adjust casting simulation parameters
- Design new alloys
- Technology transfer between lab and production furnaces.