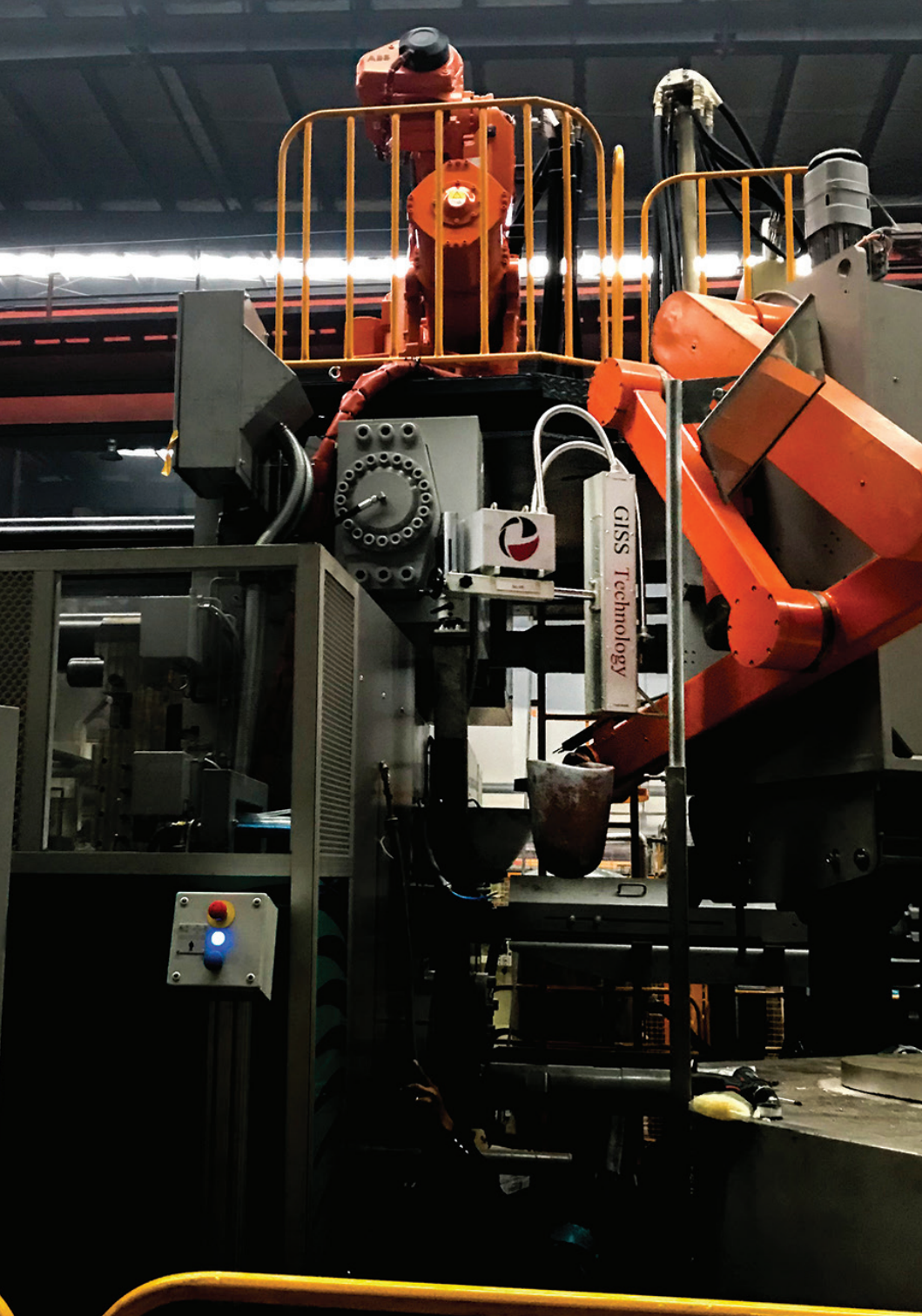
GISS Technology


GISS Technology

GISS TECHNOLOGY

GISS TECHNOLOGY HELPS DIE CASTERS REDUCE POROSITY REJECTS AND PRODUCTION COSTS AT THE SAME TIME.

GISS Technology

The World's Latest Breakthrough in the Metal Casting Industry

The GISS technology

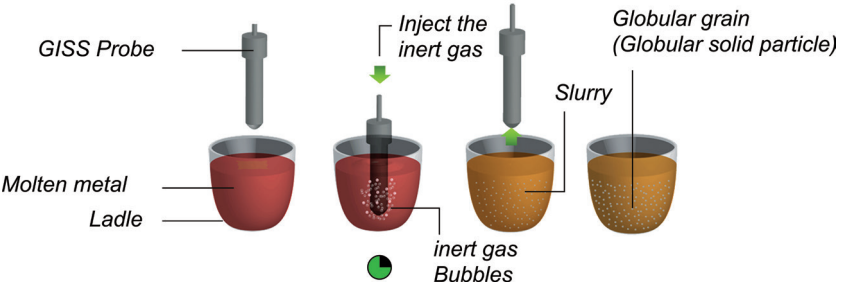
The GISS technology improves casting quality while reducing production cost at the same time.The technology applies the Superheated Slurry Casting Process, the world's latest metal casting innovation.

The GISS Technology is a quick solution technology for aluminum die casters who have porosity defect problems resulting in high reject rates. It is different from other solutions such as vacuum assist and squeeze pins because GISS Technology also reduces production costs while reducing the reject rates. Our customers are benefiting significant cost reduction applying the GISS Technology.

Besides improving quality and reducing cost, the GISS technology also enables die casting of wrought aluminum alloys such as 6061, 6063, and 7075 alloys, which can be anodized. This breakthrough will open up several opportunities in the die casting industry.

GISS PROCESS

The GISS Technology applies the Superheat Slurry Casting process, the world's latest metal casting innovation*. Instead of casting very hot liquid metal, the GISS Technology converts liquid metal into superheated slurry. Since the slurry is still superheated, it can effectively fill the die cavity. However, the slurry has significantly lower heat content than the liquid metal, so it gives several cost benefits such as die life extension and reduced cycle time. The fraction of solid, which can be controlled using the GISS unit, allows the control of flow pattern into the die cavity. As a result, gas porosity can be effectively controlled. Furthermore, the presence of pre-existing solid particles in the slurry changes the solidification mode of the metal in the die cavity such that shrinkage porosity is greatly reduced.



*International Patent Pending

The GISS Technology creates the super-heated slurry by using a special probe to inject micro-size inert gas bubbles in the liquid metal at the suitable conditions. Slurry with controlled fraction of solid is then ready for the casting process.

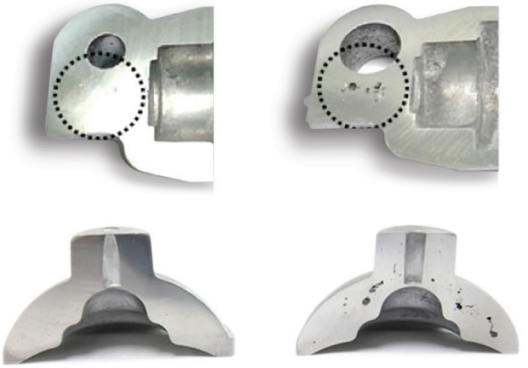
We, GISSCO, help our customers solve their problems by applying the GISS Units to the current production using existing die casting machines and dies, and provide full technical support to our customers. Customers can use the existing die designs without any modifciations to achieve the benefits of slurry casting process. We will provide technical support on the die casting parameter optimization to customers.

KEY BENEFITS

Because we are injecting slurry with lower heat content, controlled viscosity, and some initial nuclei, we can achieve cost benefits immediately using the GISS Technology. Some of the key benefits are as follows:

- Reject reduction due to gas porosity and shrinkage porosity from 10 – 50% to 1 – 5%*
- Production cost reduction by 10 – 15%*
- Cycle time reduction reduced by 15 – 25%*
- Increased die life to 2 – 4 times*
- Melting energy reduction, lubricant usage reduction, water treatment reduction by 15 – 30%*

It is noted that the actual saving and benefit values that are achieved vary, depending on the applications. In general, our customers have the pay-back period of about 6-12 months of the investment of the GISS Technology.



GISS Die Casting

Conventional Die Casting

KEY FEATURES

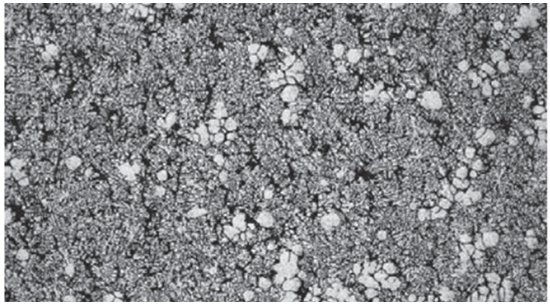
The key features of GISS Technology are as follows:

- Gas porosity is reduced in the GISS casting process because the controlled solid fraction in the slurry yields less turbulent flow compared with conventional high-pressure die casting.

- Shrinkage porosity is reduced in the GISS casting process because the initial solid particles present in the slurry act as nucleation sites in liquid metal so that different mode of solidification is achieved with less shrinkage amount also.

- Slurries entered the die with significantly reduced heat content, resulting in shorter cycle time and longer die life.

- Solid particles in the slurries are ultra-fine, yielding easy flow into the ultra-thin sections and uniform microstructure.



With these features of the slurry produced by a GISS Slurry Unit, the casting conditions also need to be optimized in order to achieve improved quality and reduced production costs. Our GISSCO team will provide technical support and know-how to the customers as the technology solution.

GISS slurry casting can be cast under gravity pressure yielding finer and more uniform grain structure with less shrinkage porosity. In addition, the solidification time is about 40% shorter, which can give a significant saving in production cycle time.

Conventional Gravity Casting

GISS Slurry Casting

APPLICATIONS

Various Electronic and Automotive Parts: 0.1-kg to 20-kg parts

GISS Slurry Unit can work with many forming processes such as:

Die Casting

In the GISS die casting process, the die casting machine and process cycle remain little changed from those of conventional die casting. The only added step occurs during the ladle transfer when a diamond probe is immersed. Therefore, no significant modifications need to be made to existing die-casting equipment.

Squeeze Casting

The addition of GISS process to make semi-solid slurry before squeeze casting process is very simple. This process provides high density, near-zero porosity, heat treatable and high mechanical properties.

Gravity Casting

GISS gravity casting have been developed and show the potential of products with improved mechanical properties, grain structure, reduced cycle time, and improved casting yield.

Alloys that can be processed with the GISS Technology

Pure aluminum, copper, silver, gold, and other metals can be processed with the GISS Technology along with many commercial alloys of aluminum, magnesium, zinc, copper, lead, tin, and iron. Actually, all metals and alloys can be effectively processed with the GISS Technology.

GISS SLURRY UNIT

The GISS Unit can be used with die casting machines of any brands and sizes

Shrinkage and gas porosity are greatly reduced by the GISS Technology

GISS SLURRY UNIT

GISS Slurry Unit is an add-on unit to be installed at a cold chamber aluminum die casting machine with simple modifications.

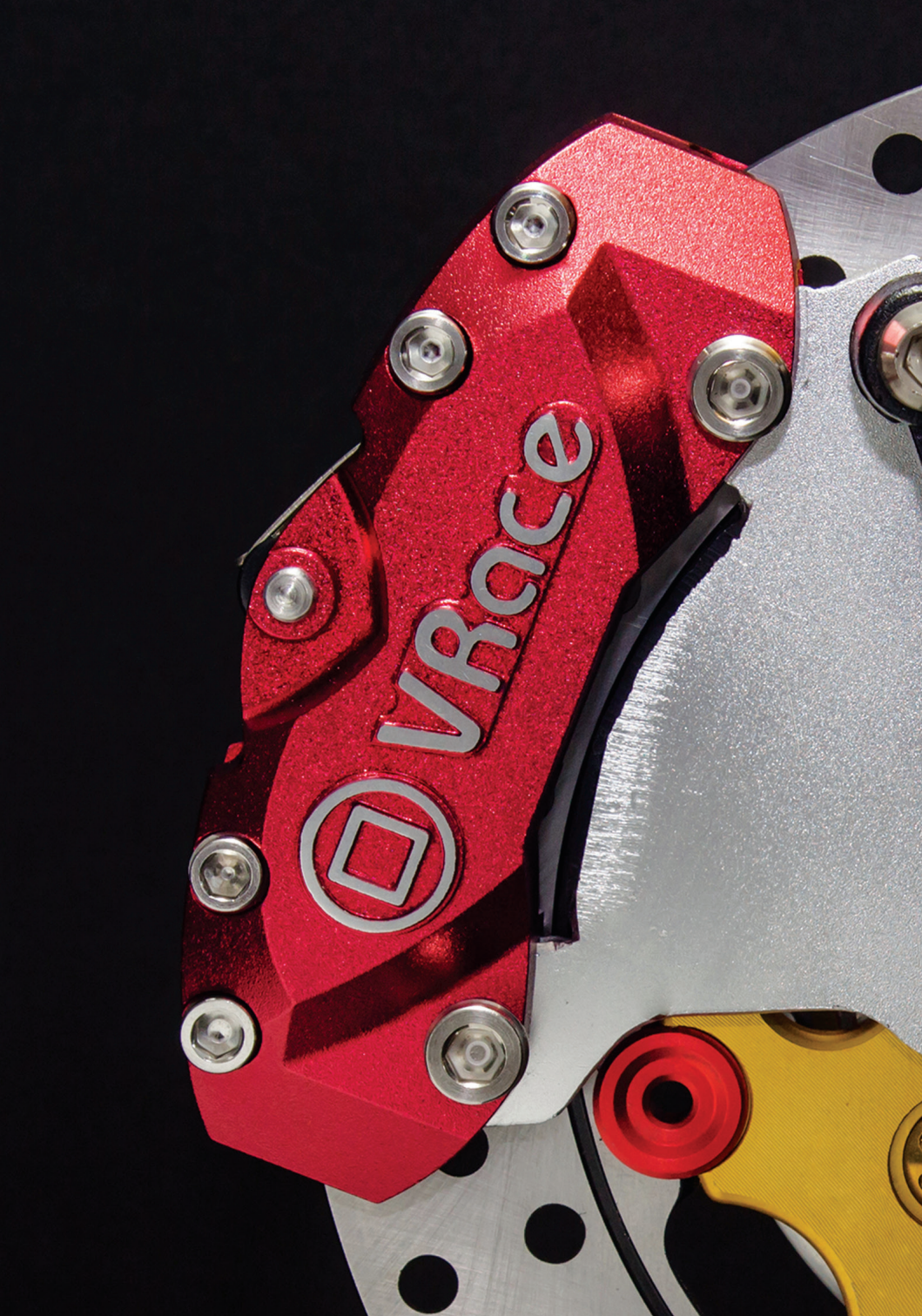
The GISS Slurry Unit is designed to work with different die casting brands and sizes ranging from 125-T to more than 3,000-T. The GISS Technology works with existing dies so that customers can benefit immediately without the need to modify the dies. We will provide the technical support on the process parameters to obtain the optimized casting conditions.

It is important to note that the objective of the GISS Slurry Unit is for process improvement, not for process change.

GISSCO provides the solutions to customers through GISS Slurry Unit with the technology know-how.

Currently, there are more than 60 GISS Units in 9 countries around the world, including Japan, Korea, China, Thailand, Singapore, India, Turkey, Mexico, and Switzerland. Key customers include Toyota Motor Corporation, Hyundai Motor, Foxconn, and LG Electronics.

Various Machine Sizes: 120-T up to 2,500-T


VRace

COLORIS

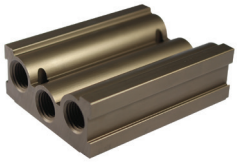
For high-performance products, GISSCO is applying GISS Technology with brake calipers under the brand name VRace. These 6061-aluminum alloy brake calipers are GISS squeeze cast, then T6 heat treated, and anodized.

High performance
and anodized aluminum parts
are produced using
the GISS Technology

COLORIS

GISSCO is also developing die cast and anodized components under the brand name ColoriS for decorative products using GISS Technology:

For high-performance products, GISSCO is applying GISS Technology with brake calipers under the brand name VRace. These 6061-aluminum alloy brake calipers are GISS squeeze cast, then T6 heat treated, and anodized.




GISS Technology

ABOUT US

WHO WE ARE?

GISSCO has the mission to promote the GISS Technology in the metal casting industry. The GISS Technology offers metal casters and parts producers substantial improvements in process time, lower parts rejects, longer die life, and better material properties in finished parts. The founder of GISSCO developed this patented technology while at MIT and launched a company in 2009 to make it available to manufacturers around the world.

TIME LINE

2003 : The Gas Induced Semi-Solid (GISS) process to prepare semi-solid structure was invented by Dr. Jessada Wannasin, Dr. Martinez and Prof. Flemings at Massachusetts Institute of Technology (MIT), USA.

2009 : GISSCO Co., Ltd. was founded by Dr. Jessada Wannasin, Prof. Flemings and team in Thailand.

2013 : The Gas Induced Superheated Slurry (GISS) technology was introduced in the market by GISSCO. The GISS Technology applies the superheated slurry casting technique.

2014 : GISSCO officially entered the international market in May by installing the first set of GISS Units in Korea.

2015 : GISSCO has established the sale network in Korea and China.

2016 : GISSCO started to sell GISS Units in China and India.

2017 : GISS Units are being used in more countries beyond Thailand, Korea, China, and India. These countries include Mexico, Singapore, Switzerland, and Japan. More than 70 GISS Units are used in these 9 countries with key customers including Toyota Motor Corporation, Foxconn, Hyundai Motor, and LG Electronics.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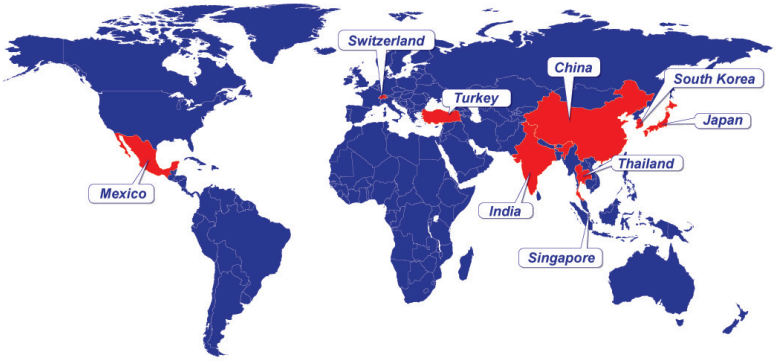
Assoc. Prof. Dr. Jessada W
Founder and
GISSCO Company Lim

CONTACT

GISS TECHNOLOGY GLOBAL NETWORK

Currently, the GISS Technology is being applied in several die casting companies in different countries.

We are also planning to expand our network to different countries in the near future. Alternatively, customers can contact GISSCO directly to discuss about possible collaboration.



If you are an aluminum die caster with the aim to reduce reject rates and, at the same time, to benefit production cost reduction, please contact us at the following address:

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170/4 Moo 3, T. Pawong A. Muang, Songkhla, 90100 THAILAND

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