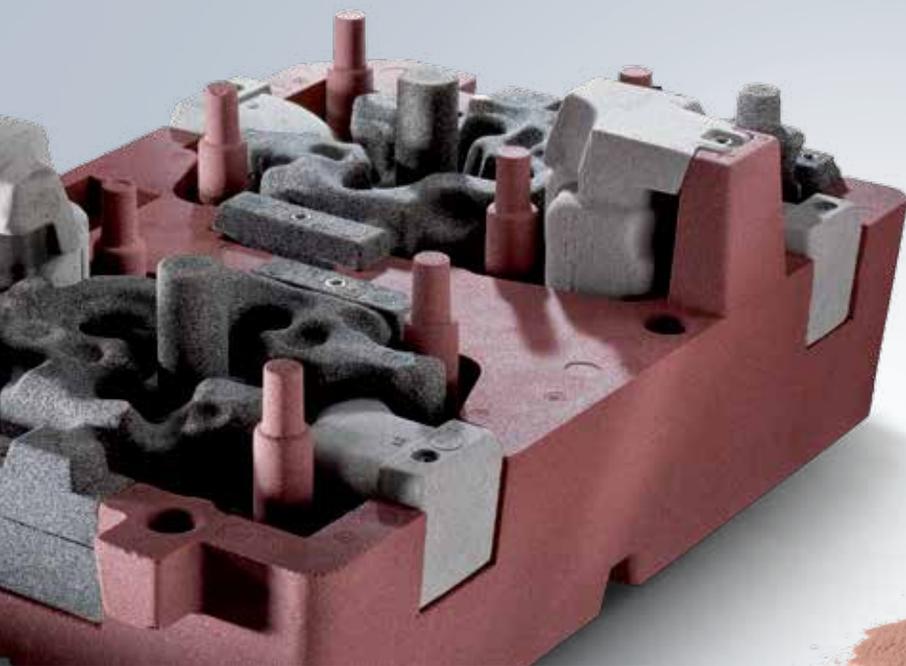




Additives

Product Line Overview



ASKCHEMICALS
We advance your casting



Improved Results via Innovative Additives

Within casting defect preventative measures additives are a tried-and-true solution. A small addition, for instance, can remedy several common maladies (e.g. surface-based defects). Nevertheless, at ASK Chemicals we are advancing additive technology beyond common uses. Our engineers – working alongside our customers – are discovering specialty additives that can mitigate the use of expensive sands and, in some instances, replace coatings entirely. Within Cold Box production, in particular, this revelation could substantially reduce costs and enhance productivity. Dimensional accuracy compliance is likewise relevant where additives may substitute coatings in thin-walled castings. Ultimately, coating-free production offers reduced material costs alongside the elimination of peripheral coating equipment, equaling huge savings.

At ASK Chemicals we provide innovation driven research through our product development approach. We focus specifically on market trends and customer demands because of the increasingly complex requirements our industry faces: reduced emissions, casting defect prevention, cost-efficiency, as well as overall casting quality. Such requirements necessitate more than just strong partnerships and outstanding technologies; rather, we believe that first-class research and development that focuses on efficiency, environmentally friendly solutions and key performance parameters is essential.

In addition we offer our customers a holistic approach that goes well beyond merely offering products. Our application technology and technical sales specialists, in particular, always assess the entire production process as a whole. Only this approach allows for customer specific solutions that are precisely tailored to meet customer requirements.

Finally, our specialists' expertise is complemented by a broad range of services that offers our customers real added value. In this way, for example, our design services can be systematically deployed to optimize the process as a whole – from conceptual development to actualized series production – thereby offering important savings and process improvement for our customers.





- Effective against casting defects
- Improved surface quality
- Can replace your coating
- Reduced cleaning costs
- Environmentally friendly solutions

Basic Information

Major additive composition types

➤ Organic

- Low addition rates
- Good flowability
- Ideal for large scale production

➤ Inorganic

- Low gas & odor emissions
- Excellent strength
- Good bench life

➤ Hybrid / Special minerals

- Low addition rates
- Casting without coating possible
- Ideal within steel applications

ASK Chemicals additives

ISOSEAL™

The environmentally friendly additive

- Inorganic
- Steel/GI/DI/CGI



VEINO™

The organic (starch/wood flour) additive

- Organic
- Steel/GI/DI/CGI



VEINO ULTRA™

The versatile low emissions additive

- Hybrid
- Steel/GI/DI/CGI/Copper Alloys



GI = Gray Iron DI = Ductile Iron CGI = Compacted Graphite Iron

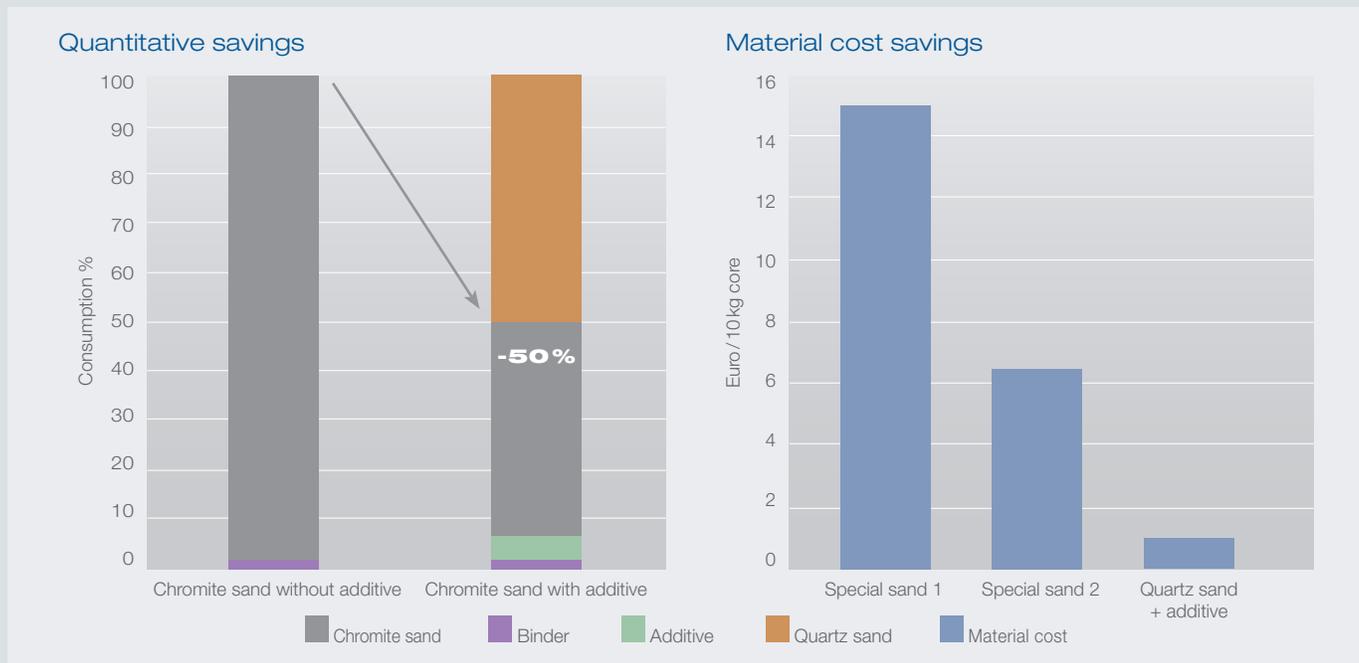
Additive classification



General benefits of additives

- Helps reduce veining defects
- Prevents penetration defects
- Improves surface finish
- Can eliminate coating usage
- Reduces fettling cost
- Clean core boxes
- Low mixing costs
- Prevents hot tears in steel castings

Material and cost savings when using additives



In addition to our range of additives, we can provide you with special sands such as bauxite sand, zircon sand, chamotte sand and resin-coated sand. Please contact us.

Custom solutions

Apart from the system solutions mentioned in this brochure, ASK Chemicals also offers you custom solutions to fit your individual process. Please contact us to discuss your specific needs.

ISOSEAL™



The environmentally friendly additive

This unique inorganic additive family stands as the coating free version within our portfolio. A significant cost saver, given the correct circumstances you may entirely eliminate coating use within your process. Additionally, the use of special minerals counteracts sand expansion allowing for greater compaction. Pressure crushes the minerals and, thus, creates a natural cushion layer along with additional space for the sand particles to fill.

Benefits

- Prevents against veining & penetration defects
- Helps improve casting surface finish
- Saves cleaning room (i.e. fettling) costs
- Low resin demand
- Environmentally friendly (no emissions)

The science behind coating-free additives

ISOSEAL™ additives make the substantial claim of eliminating the need for a coating – this would naturally lead to significant cost savings. ASK Chemicals engineers & researchers have accomplished this feat by formulating ISOSEAL™ to act as a buffer during the quartz expansion in the pouring process. This, in turn, creates a barrier layer between the sand grains and, thus, acts as a coating itself.



Image:
Brake disc caliper; a common ISOSEAL™ application along with rear axle differentials

ISOSEAL™ application chart

	Binder application			Metal application				Recommended segments									
	Cold Box	Warm box	No-Bake	Steel	Iron GI	Iron DI	Iron CGI	Turbo charger	Exhaust manifold	Brake disc	Axle housing	Auto heads/blocks	Water jacket	Oil gallery core	General housing	Pump	Hydraulic castings
ISOSEAL™	■			■	■	■	■	■	■		■	■		■	■	■	■

■ = suitable, ■ = highly suitable

VEINO™

The organic (starch/wood flour) additive

Our organic starch-based VEINO™ line is a high performance additive with an extremely low addition rate. This reduced additive consumption level is the lowest in our portfolio – leading to cost savings. Better yet, performance remains unaffected. Rather, the flowability rate of VEINO™, leading to good core compaction, is exceptional. Thus, all things considered, VEINO™ offers quality, performance and minimal investment – an excellent choice within most applications.

Benefits

- Prevents against veining & scabbing defects (in certain circumstances)
- Helps improve casting surface finish
- Excellent shakeout
- Not soluble in water

Creating space with organic components

During casting, the metal heat burns out the starch particles within VEINO™. This, in turn, creates space for silica sand to fill during expansion. This unique compaction method ultimately aids in the reduction of veining defects. Thus, cleaning room costs (i.e. fettling costs) are likewise reduced due to higher quality castings with excellent surface finish characteristics.



Image:
Automotive turbo charger; a common application for VEINO™ additives

VEINO™ application chart

	Binder application			Metal application				Recommended segments									
	Cold Box	Warm box	No-Bake	Steel	Iron GI	Iron DI	Iron CGI	Turbo charger	Exhaust manifold	Brake disc	Axle housing	Auto heads/blocks	Water jacket	Oil gallery core	General housing	Pump	Hydraulic castings
VEINO™	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ = suitable, ■ = highly suitable

VEINO ULTRA™ RS Series

The versatile low emissions additive

The VEINO ULTRA™ series is a versatile additive group that accommodates multiple binder types. RS2, for instance, was specifically engineered for warm box applications. RS4, on the other hand, is ideally suited to Cold Box & No-Bake technologies. Commonality, between the two, resides in function. Both contain iron oxide for reducing atmospheric conditions that ultimately scavenge gas thereby preventing gas defects. Additionally, the VEINO ULTRA™ HY series improves surface finish via the creation of a glaze layer between the casting and the mold and can even eliminate the need for a coating.

Benefits

- Prevents against veining & penetration defect
- Improves surface finish
- Lower gas emission than organic varieties
- Minimal effect on tensile strength
- Potential for coating free application

Sand compaction via a fluxing agent

VEINO ULTRA™ RS Series utilizes a mineral component to aid in the compaction of silica sand during expansion. Ultimately, the fluxing agent reduces the melt point of the sand which, in turn, allows the sand to deform into the voids.



Image:
Ventilated brake disc rotors;
a common application
for VEINO ULTRA™ additives

VEINO ULTRA™ application chart

	Binder application			Metal application					Recommended segments									
	Cold Box	Warm box	No-Bake	Steel	Iron GI	Iron DI	Iron CGI	Copper alloy	Turbo charger	Exhaust manifold	Brake disc	Axle housing	Auto heads / blocks	Water jacket	Oil gallery core	General housing	Pump	Hydraulic castings
VEINO ULTRA™ RS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
VEINO ULTRA™ HY	■			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ = suitable, ■ = highly suitable

Added Value for our Customers

Application technology and technical sales – for complete process transparency

Application technology and technical sales at ASK Chemicals offer our customers comprehensive expertise in all areas of foundry technology and metallurgy. We offer a comprehensive service that focuses on the production process as a whole and helps customers not only to cut costs but also to enhance their processes. ASK Chemicals also conducts casting defect analysis and offers tailored training sessions on the customer's own premises.

Benefits

- Improved decision-making via greater transparency
- Cost in-use reporting (i.e. savings)
- Reliable recommendations
- Casting defect analyses
- Quick response
- On-site training sessions
- Customized solution development

The one-of-a-kind "mobile mini-laboratory"

The mobile mini-laboratory runs a self contained continuous mixer that can utilize several different resin systems. Alongside many additional benefits its premier advantage is its ability to conduct trials without ever interrupting production.

- Uninterrupted production
- Multi-functional mobile tool
- Fast results

Currently, available to NA customers only



Design Services – for perfect casting results

Our Design Services team monitors the entire casting development process from initial design to final production of actual cast parts (i.e. prototypes). Our highly experienced engineers enjoy a wide range of knowledge within all aspects of foundry technology and metallurgy. In addition, we use only the most advanced simulation software offered today: MAGMA, Novacast, FLOW-3D and Arena-Flow®. Beyond fully optimized designs and simulation expertise, the Design Services team cooperates with external companies and service providers to assure proper project alignment for unparalleled results and guaranteed customer satisfaction.

Benefits

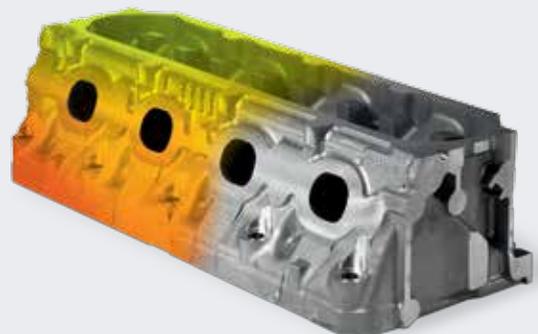
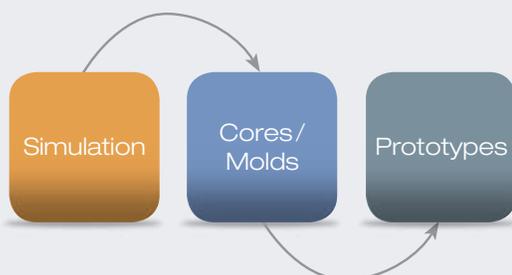
- Higher productivity and optimized catalyst consumption
- Manufacturing process design, including inorganic technology
- Calculation of optimal feed
- Optimized design and manufacture of model plates, core boxes and molds
- Less scrap
- Shorter product launch times
- Quicker time-to-market

Simulation services

The simulation of casting processes provides foundries with invaluable casting mold information. Specifically, this benefit allows for the optimization of gating & feeding systems, overflows, venting design and risers. Moreover, it provides critical insight into the influences and effects directly related to casting integrity such as, cooling & heating measurements and filling & solidification times.

From the idea to the prototype

ASK Chemicals supports your entire process from concept to prototype production. How you benefit: comprehensive expertise from a single source.



Research and development – for innovation near you

Our R&D department performs innovation driven groundwork as well as market and customer driven development. Interaction between these three areas is of fundamental importance in offering our customers technologically sophisticated products and efficiency enhancing solutions at all times. Through close cooperation and the constant exchange of ideas with our application technology and technical sales specialists, R&D at ASK Chemicals is always in tune with the market and also has a presence on the customer's own premises itself.

Benefits

- Highly experienced researchers
- Global presence and availability
- Comprehensive knowledge of the regional sand types and technological requirements
- Short response times for our customers
- First class equipment

Comprehensive research and development services

Pilot foundry

- Fully equipped research foundry
- Mold production, mold/core package assembly and casting
- "Real World" foundry process representation

Metallurgical investigations

- Comprehensive examination of the graphite structure and metallic matrix: Graphite size, Number of nodules, Degree of dispersion, Nodularity, Ferrite/pearlite ratio
- Preparation of metallurgical reports

Sand laboratory

- Examination of high temperature materials
- Testing of tensile strength, compression and transverse loading
- Sand characterization and analysis

Product development and technical support

- Casting defect analysis
- Full spectrum chemical & polymer analysis
- Product, process and test method development



ASK Chemicals L.P.

495 Metro Place South
Suite 250
Dublin, OH 43017
Phone: +1 800 848 7485
Fax: +1 614 761 1741
info.usa@ask-chemicals.com
www.ask-chemicals.com

Global Product Manager Additives

Dr. Reinhard Stötzel
Phone: +49 211 71 103-0
Reinhard.Stoetzel@ask-chemicals.com

This information is based on our current state of knowledge and does not represent assurance of the properties of the products described. We are only liable for product-related advice and information within the scope of duties of disclosure included in collateral contractual agreements unless expressly agreed otherwise. (12/14)

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