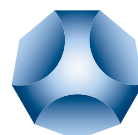
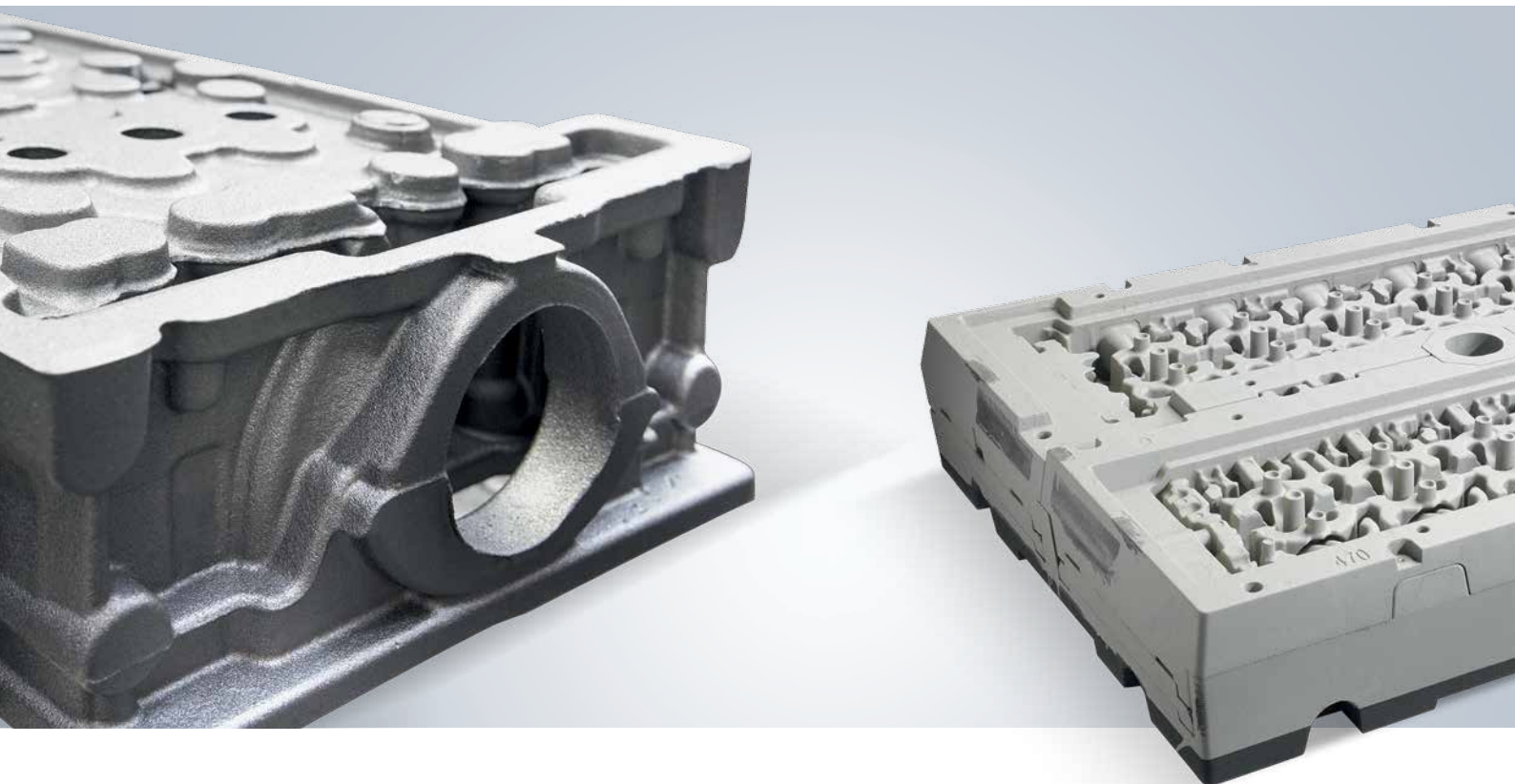




Cold Box

Product Line Overview



Tried-and-tested Technology from the Inventors of the Cold Box System

The invention of the polyurethane Cold Box system (PUCB) in 1968 set a standard that still applies to this day and led to a change in the production processes in foundries worldwide. With the development of this technology ASK Chemicals gave the market a high-performance and highly productive core manufacturing method that enabled high-quality mass production. Naturally, though, technologies and market requirements are changing all the time – in terms of what both customers and suppliers want. For this reason, ASK Chemicals continues to play a leading role in innovation and is always looking for new ways to enhance our offerings and provide our customer's greater value.

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, as well as cost-efficiency. 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 offer 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.

- Inventor of Cold Box technology
- Leading research and development team
- Application-specific solutions
- Holistic approach with value-adding services

Basic Information

Major Cold Box technologies

➤ Phenolic urethane Cold Box binders

PUCB

- Invented by ASK Chemicals in 1968
- Known for high productivity and low cost in use

➤ Epoxy acrylic SO₂ Cold Box binders

EASO₂

- Fastest curing Cold Box technology
- Indefinite mixed sand life

➤ Hybrid phenolic epoxy Cold Box binders

HPE

- Highest dimensional accuracy
- Invented by ASK Chemicals in 1990s

➤ Resol CO₂ binders **CO₂**

- Water-based resin
- Usable with most sand types

➤ Alkaline phenolic Cold Box binders

APCB

- Predictable “first stage through cure”
- Excellent release properties

ASK Chemicals brands

➤ ISOCURE **PUCB**

The original and universal Cold Box binder

➤ ECOCURE HE, SL, RS, BLUE **PUCB**

The environmentally driven phenolic urethane Cold Box binder

➤ ISOSET **EASO₂**

Highest production, fastest cure and indefinite bench time

➤ ISOMAX **HPE**

The premium Cold Box binder possessing the widest positive traits

➤ NOVANOL **CO₂**

Water-based, eco-friendly binding agent for Cold Box process

➤ BETASET **APCB**

Water-based, eco-friendly binding agent for Cold Box process

Cold Box classification



General benefits of Cold Box

- High strength and productivity
- High humidity stability
- Ability to create highly complex cores
- No need for pre-heating core tools

Differentiating factors

				
Ecology	Productivity	Quality	Cost	Flexibility
<ul style="list-style-type: none">• Reduced odor• Low BTX emissions• Minimized monomer content• Few hazardous air pollutants	<ul style="list-style-type: none">• Fast cycle times from high reactivity• Less tooling damage• Reduced cleaning time• Long benchlife and high strengths	<ul style="list-style-type: none">• Less casting defects• Excellent core dimensional accuracy• Exceptional deformation resistance• High core stability	<ul style="list-style-type: none">• Reduced binder usage• High tool availability• Less core scrap• Less catalyst consumption	<ul style="list-style-type: none">• Multiple sand types• Climate adaptability• Multiple metal type usability

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.

ISOCURE

The original and universal Cold Box binder system

ISOCURE binders are the industry standard for high production foundries producing sand cores and precision sand molds. This product family can be used to make all types of cores with both highly automated production equipment and manual operations. The broad range of products can be used in highly specialised casting processes or for more standard types of applications. The use of ISOCURE binders can be matched to a foundry whose need is to produce high quality, superior cores and molds.

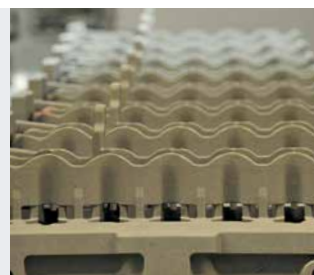
Benefits

- Optimized for productivity
- Robust system for multiple casting types
- High strength properties
- Low cost in use

A premium Cold Box binder










ISOCURE Focus is the premier brand within the ISOCURE family. Known for its exceptional performance characteristics, ISOCURE Focus is fully customizable to meet your unique foundry process needs.

- Lowest cost in use
- High strength
- Improved sand flow ability



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
700 Series	MIRATEC [*]	VEINO [*]	ECOPART [*]

Attributes		Application	Quick reference			
			<div>Major</div> <div>Minor</div>			
Premium	Premium strength and speed Excellent humidity resistance Lowest binder consumption	Automotive Heavy truck Aerospace Universal	 Productivity	 Quality	 Ecology	 Flexibility
Performance	Excellent strength and speed Good all-around performance Lowest environmental impact	Automotive Heavy truck Agriculture Universal	 Quality	 Flexibility	 Productivity	
Standard	Robust performance Good quality Predictable curing Cost competitive	Automotive Heavy truck Municipal Universal	 Quality	 Cost		

^{*}Tailored product recommendations available upon request.

ECOCURE

The environmentally driven phenolic urethane Cold Box binder

ECOCURE phenolic urethane binders focus on providing foundries with the high-end environmental performance without sacrificing the speed and strength of the ISOCURE family of products. This is accomplished by not only adjusting the solvents and additives in the binder, but also changing the chemistry backbone to produce products with less environmental impact.

Benefits

- Lowest environmental impact
- Fast binder that runs clean
- High strength properties
- Low binder usage

Smoke-reducing ECOCURE RS

ECOCURE RS has been specially developed to reduce casting smoke emissions, as well as gas and condensate formation. In addition, ECOCURE RS provides high thermal stability for dimensionally accurate castings. This system is suitable for aluminum, steel and iron casting.

EC 30 RS 4604 /
60 RS 4605










Standard
system



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
700 Series	MIRATEC *	VEINO *	ECOPART *

Attributes		Application	Quick reference			
			<div>Major</div> <div>Minor</div>			
Premium	Lowest environmental impact Excellent humidity resistance Premium strength and speed Lowest binder consumption	Automotive Heavy truck Aerospace Universal	 Ecology	 Productivity	 Quality	 Flexibility
Performance	Good environmental impact Excellent strength and speed Good all-around performance	Automotive Heavy truck Agriculture Universal	 Ecology	 Quality	 Flexibility	

*Tailored product recommendations available upon request.

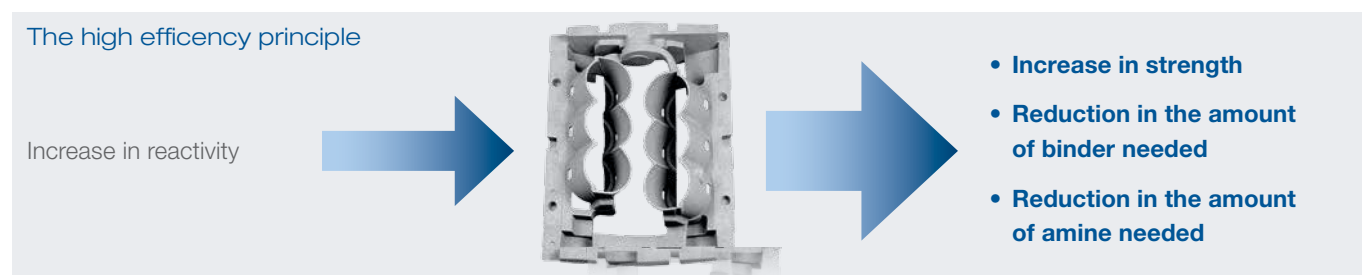
ECOCURE HE

High efficiency Cold Box binder

ECOCURE HE binder systems set new standards in ecology and economy. They have a lower binder requirement without compromising the usual efficiency. As a result, several factors such as catalyst consumption, odor, emissions, core box cleanliness, and gas formation can be positively influenced.

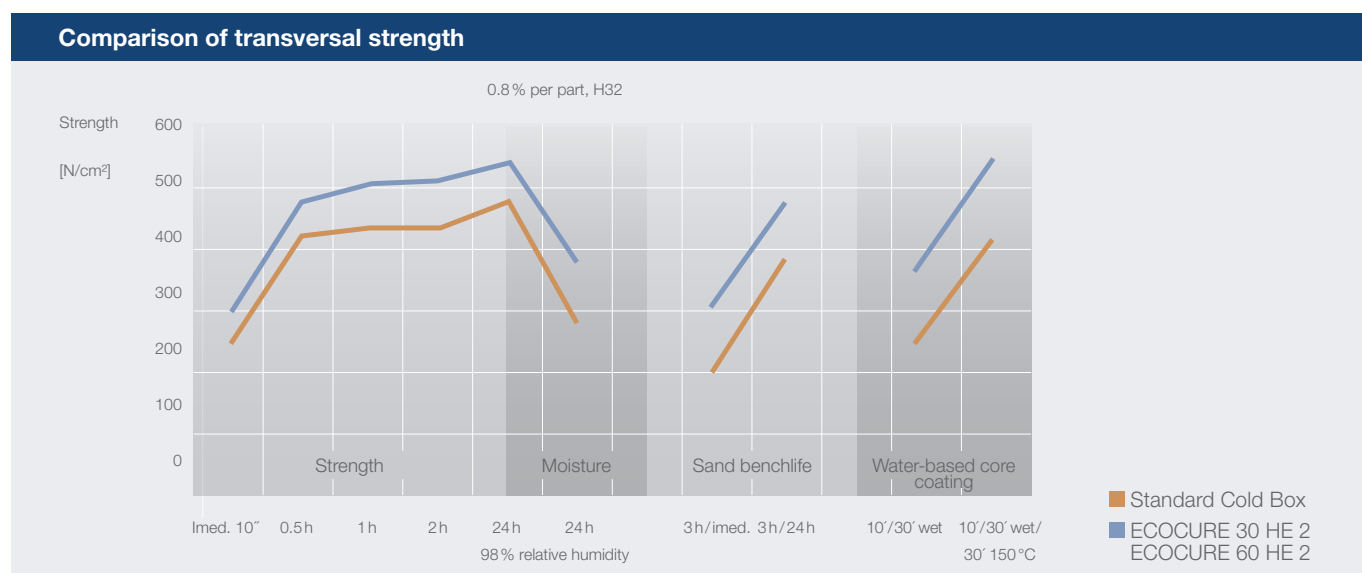
Benefits

- Up to 40 % lower BTX emissions
- Up to 25 % less amine consumption*
- Up to 15 % higher core blowing cycle times
- Up to 25 % lower gas and condensate formation



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
700 Series	MIRATEC [®]	VEINO [®]	ECOPART [®]



* Tailored product recommendations available upon request.

ECOCURE BLUE

Latest Cold Box platform technology

The ECOCURE BLUE platform technology is the world's first technology that has a Cold Box part 1 that is not classified as a hazardous material* and thus helps to considerably reduce phenol emissions in the process. First tests also have shown a reduction of the phenol content in used sand. This leads to a positive effect with regard to disposal costs. Ecology and economy are not mutual exclusive, which is perfectly shown by ASK Chemicals ECOCURE BLUE HE Systems that are in no way inferior to the currently available best Cold Box binders on the market when looking at the reactivity, strength and casting results.

Benefits

- Free of hazardous ingredients**
- Can be combined with ECOCURE HE binder
- Combines the advantages of ECOCURE HE Cold Box binders with high environmental compatibility
- Free phenol < 1 %, Free formaldehyde < 0.1 %
- Savings with logistics and storage

Consistent development of the ECOCURE HE binders through combination with the ECOCURE BLUE platform

Technology platforms

- 2007: ECOCURE High Efficiency
- 2015: ECOCURE BLUE

Binder

- 2008: ECOCURE HE 1. Generation
- 2011: ECOCURE HE 2. Generation

ECOCURE HE + ECOCURE BLUE = ECOCURE BLUE HE



Recommendations

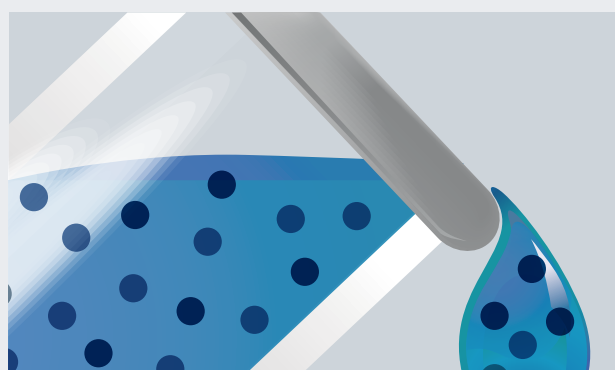
Catalyst	Coatings	Additives	Auxiliaries
700 Series	MIRATEC ⁺	VEINO ⁺	ECOPART ⁺

Compared to a conventional binder system, without any harmful ingredients**

Standard Cold Box binder



ECOCURE BLUE



- Base: formophenolic / MDI
- Solvents with low EHS impact
- Solvents with low OEL (e.g. aromatics)
- Additive with low OEL
- Monomers (phenol / formaldehyde)

* Tailored product recommendations available upon request. ** According to the CLP regulation

ECOCURE SL

Solvent-less Cold Box technology for iron and aluminum applications

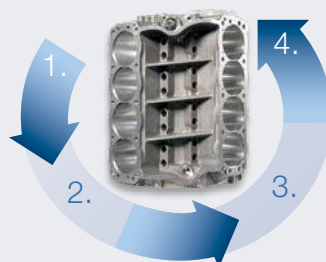
ECOCURE SL completely eliminates the need for solvents in part 2 of the Cold Box formulation. It achieves a significant reduction in emissions, saves energy and materials, and at the same time considerably improves the handling properties. ECOCURE SL is suited for both aluminum and iron casting.

Benefits

- Fewer emissions due to less binder
- Shorter cycle times
- Less cleaning due to less binder and amine
- Better shakeout
- Longer cleaning intervals
- Lower costs due to binder and catalyst savings

Greater added value with ECOCURE SL

1. SL Cold Box formulation
2. Binder reduction
3. Reduced amine usage
4. Optimization of the entire process chain



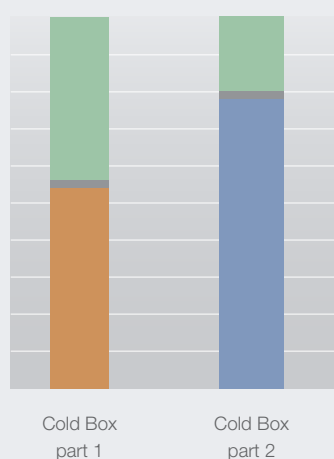
Greater added value

Recommendations

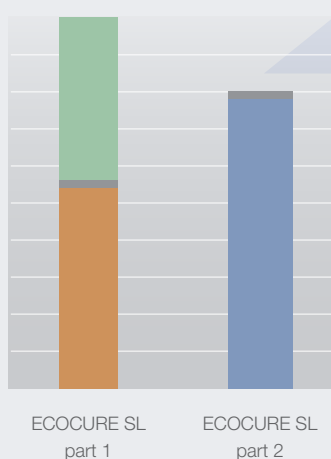
Catalyst	Coatings	Additives	Auxiliaries
700 Series	MIRATEC*	VEINO*	ECOPART*

Comparison of transversal strength

Standard Cold Box Formulierung



ECOCURE SL Formulierung



Solvent-free part 2:
Comparison of formulations

- Typical formulation for aluminum casting:
0.55 % part 1 and 0.55 % part 2
- Formulation with the SL system:
0.55 % part 1 and 0.50–0.40 % part 2

■ Phenol-formaldehyde resin
■ Di-phenylmethane – Di-isocyanate
■ Additives
■ Solvents such as: Aromatics, polar esters, plasticizers, fatty acids, esters, aliphatics

* Tailored product recommendations available upon request.

ISOSET

Highest productivity, fastest cure and an indefinite benchlife

ISOSET binders were developed to solve a key problem faced by foundries; the benchlife of mixed sand. As the sand binder mixture ages, in most binder systems it begins to advance, and at a certain point will no longer be usable to produce quality cores and molds. This is especially costly when there is machine down time. In most cases this sand binder mix must be discarded to avoid quality problems. ISOSET technology solves this problem. The binder can be mixed into the sand and left indefinitely. It will not cure until it comes in contact with the sulphur dioxide catalyst.

Benefits

- Minimal core sand waste, as the sand binder mix has an unlimited benchlife
- Lower operation cost
- Can reduce need for coating








Operation cost: the benefit of foresight

At one of the leading automotive original equipment manufacturers (OEM's) ISOSET is being utilised for cylinder head production. Due to "smart economics" this OEM could install fewer machines and still produces the same number of cores/castings using ISOSET – a story about the importance of cost in use.



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
SO ₂	MIRATEC [*]	VEINO [*]	ECOPART [*]

	Attributes	Application	Quick reference			
			<div>Major</div> <div>Minor</div>			
Premium	Premium strength and speed Highest erosion resistance Low mixed sand waste Lower cost to use	Automotive Heavy truck Aerospace Universal	 Productivity	 Quality	 Ecology	 Flexibility
Standard	Robust performance Good quality Cost competitive	Automotive Heavy truck Universal	 Productivity	 Flexibility	 Cost	

^{*}Tailored product recommendations available upon request.

ISOMAX

The elite Cold Box binder possessing the widest positive traits

ISOMAX binders are a hybrid epoxy phenolic resin designed to produce repeatable cores at extremely fast cycle times. The dimensional stability of these cores is not surpassed by any current system. The non-ferrous version also exhibits the fastest shakeout times currently seen. Coupled with the extended benchlife of these products, ISOMAX makes for a unique technology that is capable of making worldclass castings at a low cost to produce.

Benefits

- Fast cycle times
- Excellent shakeout
- Extended life of mixed sand
- Dimensional stability

A productivity boost in brake disc production

ASK Chemicals ISOMAX binder system is utilised in the production of one of the largest original equipment manufacturers (OEM's) in the world. Here ISOMAX pumps out millions of disc brake rotors in just one location using two production lines.



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
700 Series	MIRATEC *	VEINO *	ECOPART *

Attributes		Application	Quick reference			
			<div>Major</div> <div>Minor</div>			
Premium	Excellent dimension stability Fastest cycle times Extended life of mixed sand Excellent shakeout	Brake disc Manifolds				
			Quality	Flexibility	Productivity	Cost

*Tailored product recommendations available upon request.

NOVANOL

Water-based binding agent for Cold Box process

NOVANOL is a water-based, alkaline phenolic binder with excellent heat resistance that has been specially developed for steel applications, although this binder is equally suited to iron and non-ferrous applications. NOVANOL is an alternative to BETASET if CO₂ is to be used instead of methyl formate. The application of NOVANOL is recommended for all types of castings. Since they are water-based binding systems, this binder is a good solution for foundries that are seeking to improve their environmental performance.

Benefits

- Perfect for steel casting
- Clean process
- Easy stripping

NOVANOL – the versatile system for steel castings

This universal binder systems provides excellent castings surfaces even without coating application. It provides good strength values. The NOVANOL system is largely solvent-free; there are only very low emissions during manufacturing and storage of the cores. The installation of a gas scrubber is not required.



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
CO ₂	MIRATEC*	VEINO*	ECOPART*

Attributes		Application	Quick reference		
			<div>Major</div> <div>Minor</div>		
Performance	Water-based binder Perfectly suited to steel castings Low odor emissions during core and mold making Excellent final strength	Hydraulic parts General industrial Automotive	 Quality	 Flexibility	 Ecology

*Tailored product recommendations available upon request.

BETASET

Water-based and eco-friendly binding agents for the Cold Box process

BETASET are water-based, alkaline phenolic binders with excellent heat resistance that have been specially developed for steel casting application, although they are equally suited for iron and non-ferrous casting.

Benefits

- Perfect for steel casting
- Easy stripping
- Suited for water-based coatings

Excellent casting surfaces

BETASET is specially well adapted for the production of middle and small series of heavy cores for steel and iron applications, and especially for the customers who are looking for a very good casting surface without nitrogen contamination.



Recommendations

Catalyst	Coatings	Additives	Auxiliaries
Methylformate	MIRATEC *	VEINO *	ECOPART *

Attributes		Application	Quick reference		
			<div>Major</div> <div>Minor</div>		
Performance	Water-based binder	Hydraulic parts General industrial Automotive			
	Perfectly suited to steel castings Low odor emissions during core and mold making Excellent final strength		<div> Quality </div> <div> Flexibility </div> <div> Ecology </div>		

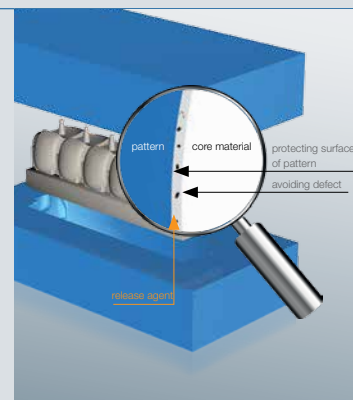
*Tailored product recommendations available upon request.

Our Auxiliaries Portfolio

Release Agents

ASK Chemicals' highly engineered release agents come in a variety of formulations to accommodate various applications.

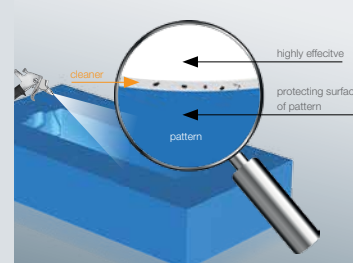
- ZIP SLIP are release agents for all gas-curing, cold-curing and hot-curing core and mold making processes as well as green sand applications.
- BENTOGLISS solvent-free release agents are highly recommended for bentonite-bonded molds from the pattern.
- ECOPART are eco-friendly and efficient release agents for all gas-curing, cold-curing as well as hot-curing core and mold making processes.



Metal Cleaners

ZIP CLEAN metal cleaners are highly efficient and thus reduce time and money.

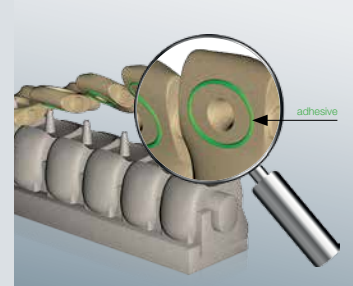
- Metal cleaners free of NMP available
- Low odor



Adhesives

ASK Chemicals' adhesive solutions – suitable for automatic metering devices – encourage high production profitability, reducing your handling and cycle time. ASK Chemicals' adhesives are suitable for air-drying, oven-drying and microwave drying.

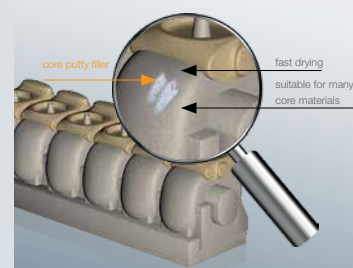
- Water-based
- Hot melt glues
- 2 component glues
- Quick glue



Core Putty Fillers

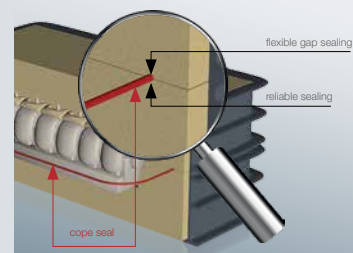
With ASK Chemicals' ASKOPASTE core putty fillers you can reduce your scrapped cores by simply repairing them.

- Ideal for the repair and reworking of minor core defects and damaged contours
- Optimized packaging for efficient transport and application



Cope Seals

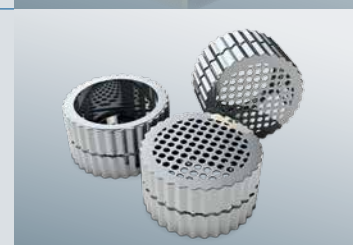
ASK Chemicals' ASKOROPE cope seals are ideal for when you need to prevent leakage from the mold through the mold joint, particularly in the in-gate area.



Core Box Vents

ISOVENTS shorten gassing times, minimize cleaning and extend the service life of the vents, thereby increasing foundry productivity.

- Available in multiple sizes



Added Value for our Customers

Technical service and sales – for complete process transparency

Technical service and 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 analyses and offers its customers the opportunity to have tailored training sessions on the customer's own premises.

Benefits

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

Our pilot foundry – more than just state-of-the-art

ASK Chemicals offers fully equipped test foundries at its sites in Hilden and Dublin (Ohio). Modern core shooting machines allow to replicate the customer's processes at the pilot foundry and to perform troubleshooting and systematically advance technologies and products in collaboration with our R&D department.

Highlights

- Ultramodern core shooting machine on an industrial scale for all common processes available on the market.
- Advanced core shooting machine on a laboratory scale for quality assurance and process control
- Mold production, including all inorganic processes
- Melting of flake graphite and nodular graphite cast iron up to 100 kg (220.46 lb)
- Melting of aluminum up to 160 kg (352.74 lb)
- Metallurgical studies, e.g. spectral analyses of iron and aluminum structures



Design Services – for perfect casting results

Our Design Services team monitors the entire process from the development of the design concept and validation right up to the production of the cast part prototype. Our Design Services team has the right combination of design, production and simulation expertise, co-operates with external companies and service providers, and enjoys extensive industry experience. ASK Chemicals' simulation service offers wide-ranging technical knowledge and understanding combined with state-of-the-art simulation programs (MAGMA, Novacast, FLOW-3D and Arena-Flow).

Benefits

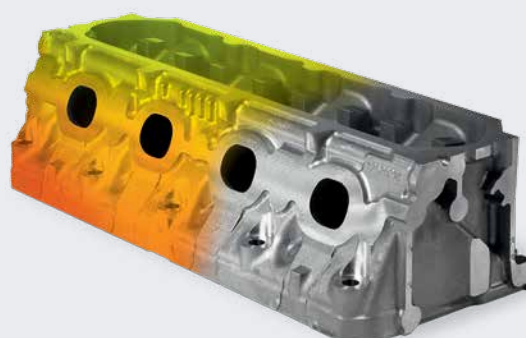
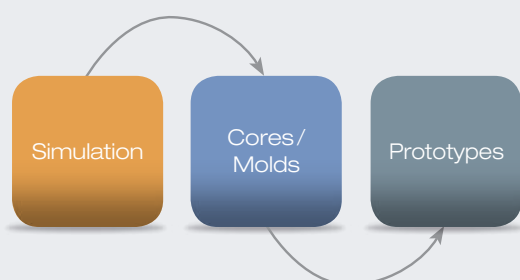
- Higher productivity and optimized catalyst consumption
- Manufacturing process design, including inorganic technology
- Calculation of optimal feed
- Optimized design and manufacture of model plates, core boxes and molds
- Less casting defects
- Shorter product launch times
- Quicker time to market

Simulation services

The simulation of casting processes provides foundries with invaluable casting mold information. Specifically, this benefit allows for the optimization of gating and 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 and heating measurements, filling and solidification times.

From the idea to the prototype

ASK Chemicals supports your entire process from the concept to prototype production.



Research and development – for innovation near you

Our Research and Development department performs both innovation-driven groundwork as well as market and customer-driven development. Interaction between these three areas is of fundamental importance in terms of 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, research and development at ASK Chemicals is always in tune with the market and also maintains a presence on the customer's own premises.

Benefits

- Many years of experience
- 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 of chemical and polymer analysis
- Product, process and test method development



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Visit www.ask-chemicals.com/trademarks for a complete list of our trademarks.

Please contact ASK for any questions concerning the usage of these marks.

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