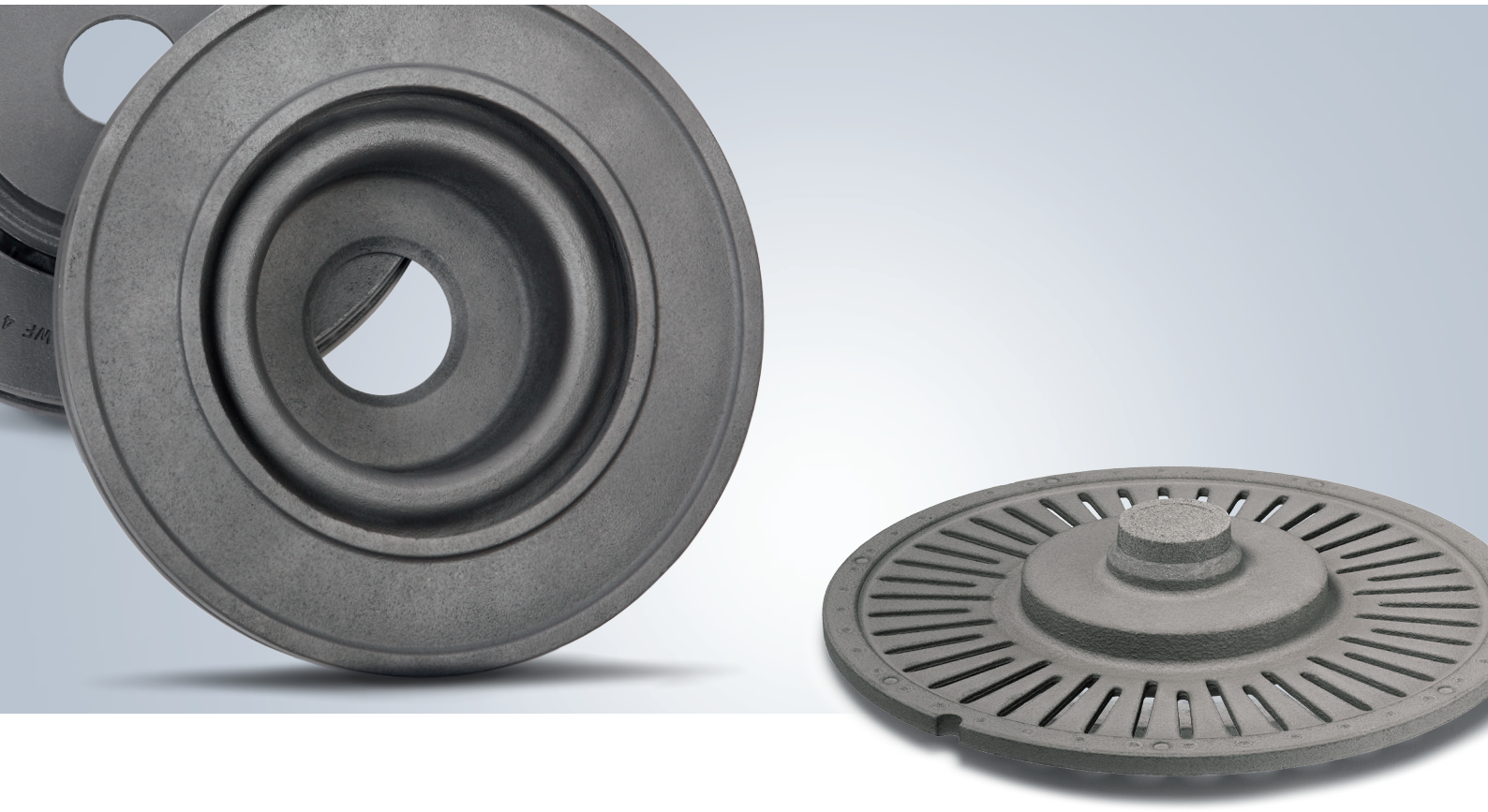
Coatings

Product Line Overview



ASKCHEMICALS

Industry-leading Coatings for Ideal Casting

Coatings from ASK Chemicals are much more than a simple layer between sand and molten metal. They largely determine the surface quality of the casting and systematically remedy casting defects. While all our coating systems are primarily characterized by the fact that they make for excellent casting results, minor fettling work and increased productivity and efficiency in the pouring process, the use of water-based coatings provides other unbeatable advantages. No solvents are used for the dilution, which is why water-based coatings are emission-free, do not pose a risk to employees and reduce the cost of dilution. Foundries can therefore dispense with installing Ex equipment and need not adopt any extra fire safety measures. Finally, storage volumes are unlimited with water-based coatings. Our water-based coatings produce significantly more convincing casting results than conventional coatings.

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 is facing: 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 are 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. For example, our design services can be systematically deployed to optimize the process as a whole – from conceptual development to actual series production – thereby offering important savings and process improvement to our customers.

- Decades of coating expertise
- Comprehensive application portfolio
- Progressive eco-friendly options
- Tailor-made coating solutions
- Holistic value-added services

Basic Information

Coating formulation types

➤ Water-based

- Environmentally friendly
- No HAZMAT issues
- No major transportation, handling or constraints

➤ Alcohol-based

- Very fast drying and flammable
- Frost-resistant
- Allround coating

➤ Lost Foam and Full Mold

- Control of mold filling process
- Controlled absorption of decomposition products
- Allround coating

ASK Chemicals coating types

➤ VELVACOAT

- Alcohol-based
- Non-automotive
- Allround coating

➤ MIRATEC

- Water-based
- Automotive
- Dipping

➤ SOLITEC

- Water-based
- Non-automotive and specialty
- Brushing, spraying, flowing

➤ CERAMCOTE

- Water-based
- Lost Foam and Full Mold
- Automotive and non-automotive
- Allround coating

General benefits of coatings

- Improved casting surface quality
- Secure against many casting defects
- Reduce fettling and rework time
- Prevent unwanted chemical and/or thermal reactions
- Control of metallurgical effects

Coating application families

Automotive

- Brake disk
- Cylinder head
- Engine block
- Turbo charger
- Axle housing

Non-automotive

- Heavy iron casting
- Medium iron casting
- Light iron casting
- Steel casting
- Wind power casting

Specialty

- Melting shop
- Centrifugal casting
- Hydraulic casting
- Aluminum gravity die-casting

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.

VELVACOAT

Versatile alcohol-based coatings prevent defects

Due to its versatility, VELVACOAT is an ideal coating for multiple applications and metal types. It was engineered specifically to mitigate burn-in and penetration defects. Additionally VELVACOAT coatings provide excellent casting surfaces. They can be used for multiple applications, including brushing, spraying, flow coatings and dipping.

Benefits

- Fewer casting defects and excellent casting surfaces
- Very fast drying and flammable
- Available in cooler burning formulations
- Universal coating

Image:
V 12 crank case

VELVACOAT coatings

Product	Color	Application				Binder					Metals						Application	Properties							
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate / Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metalization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
VELVACOAT AC 501 / 503		■	■			■	■		■					■		■	Aluminium casting (e.g. housing elements)	E		■			••	Retarded flaming	1.1
VELVACOAT CC 601		■	■	■	■	■	■	■	■					■			Universal coating (e.g. socket cores)	E		■			•	Excellent release properties	1.2
VELVACOAT GH 501 /502		■	■	■	□	■	■	■	■	■				■	□	□	Pump housings, counterweights, gearbox housings	I/E	■	■			••	Cold Box universal coating	1.2
VELVACOAT GH 701 / 702		■	■			■			■	■				■			Electric motor housings	I/E		■	■		••	Extreme high permeability; IPA-free available	1.1
VELVACOAT HI 602 / 605			■	■	■				■	■			■	■			Universal coating (e.g. counter weights, wind power roto hubs, gearbox housings)	I/E	■	■			•	High yield; IPA-free available	1.5
VELVACOAT HI 704 / 707		■	■	■	■	■	■	■	■	■				■			Universal coating (e.g. medium-sized gearbox housings, pump housings)	I/E	■	■			•	Improved remixing; less setting property	1.5
VELVACOAT HI 703 / 733		■	■	■	■	■	■	■	■	■			■	■	□		Heavy casting (e.g. wind power rotor hubs, water- and steam-operated turbines)	I		■			•	High degree of refractoriness; diables grafite degeneration; zircon-free	1.6
VELVACOAT ST 603 / 606		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Heavy & steel casting (e.g. pump housings)	I		■			○	Excellent flooding properties	1.7
VELVACOAT ST 702		■	■	■	■	■	■	■	■	■	■		■	■	■	■	Heavy & steel casting (e.g. pump housings)	I		■			○	Excellent flooding properties; water-free system	1.9
VELVACOAT ST 707			■	■	■	■	■	■	■	■	■		■	■	■		Heavy & steel casting (e.g. water- and steam-operated turbines)	I		■			•	High degree of refractoriness	2.2
VELVACOAT ST 801		■	■	■	■	■			■	■	■	■	■	■	■		Heavy & steel casting (railroad switches, mill work parts)	I		■			○	Manganese steel / universal; water-free system	1.8

E = ethanol, I = isopropyl, W = water, □ = partly suitable, ■ = suitable, ■ = particularly suitable, •• very slow, • slow, ○ medium, • fast, •• very fast

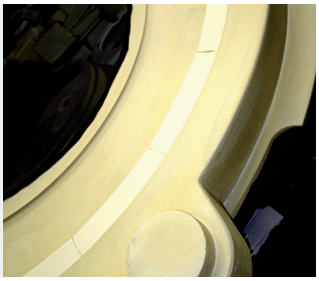
Highlights

Avoiding burn-in defects

The superior refractoriness of VELVACOAT coatings for iron and steel castings makes it an exceptional solution for avoiding burn-in defects. VELVACOAT prevents the chemical reactions that cause this defect. VELVACOAT is a highly protective barrier between sand and molten metal.

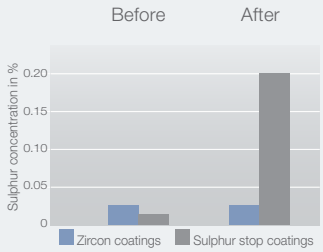
Zircon-free coatings for heavy iron and steel applications

ASK Chemicals has developed an innovative zircon-free refractory combination for heavy and thick-walled iron, as well as steel castings. In such extreme applications, it provides the same or even better casting results as achieved with coatings containing zirconium. Two key advantages of zircon-free coatings include low density and material handling.



Metallurgicial coatings and sulphur stop

New types of refractory coating formulations, which bind the forming SO_2 or suppress its transport from the acid cured No-Bake sand system, prevent the degeneration of graphite.



VELVACOAT coatings highlights

Product	Color	Application				Binder					Metals							Application	Properties							
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate / Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metallization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
VELVACOAT IM 701			■	■	■	■	■	■	■	■	■	□	■	■	■	■	Universal coating (e.g. medium-sized gearbox housings, pump housings)	I		■			•	Impregnating coating; zircon-free	1.8
VELVACOAT IM 801		■	■	■	■	■	■	■	■	■	■		■	■	■	■	Universal coating	I		■			•	Impregnating coating	1.8
VELVACOAT IM 801 (DOSE)		■	■	■	■	■	■	■	■	■	■		■	■	■	■	Universal coating	I		■			•	Impregnating coating; ready to use in spray cans	1.8
VELVACOAT RP 901		■	■	■	■	■	■	■	■	■	■		■	■	■	■	Rapid Prototyping, all alloys	I		■			○	Excellent application properties; water-free system	1.9

E = ethanol, I = isopropyl, W = water, □ = partly suitable, ■ = suitable, ■ = particularly suitable, •• very slow, • slow, ○ medium, • fast, •• very fast

MIRATEC

Innovative coatings for serial casting production

MIRATEC water-based coatings are the highest performing in their class. When applied using the dipping method, MIRATEC is ideal for automotive applications, as it has the shortest cycle times. MIRATEC coatings provide an even coating layer especially with complex core packages or challenging core geometries. Thanks to its engineered formulation and tailored characteristics (e.g. gas permeability), the innovative coating technology reduces casting defects and provides an excellent surface finish.

Benefits

- Enhanced refractoriness
- Short drying times
- Short manipulation time
- Fewer casting defects and excellent casting surfaces

Image:
V 8 cylinder block, GJL

MIRATEC coatings

Product	Color	Application				Binder					Metals						Application	Properties								
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate / Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metallization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
MIRATEC DH 402		■	■				■	■						■			Universal coating (e.g. housing elements)	W	■	■	■	■	•	Enhanced refractoriness	1.4
MIRATEC GH 401		■					■	■						■			Universal coating (e.g. gearbox housings)	W	■	■			•		1.4
MIRATEC HC 501		■					■	■						■			Automotive casting (e.g. engine blocks & hydraulics castings)	W	■	■			○		1.4
MIRATEC HY-Series		■				■	■	■	■	■			■	■		□	Automotive casting (e.g. cylinder heads, engine blocks)	W	■	■	■	■	•	Alcohol-dilutable	
MIRATEC MB 501		■					■	■						■			Automotive casting (e.g. cylinder heads, engine blocks)	W	■	■		■	•		1.4
MIRATEC TS-Series		■					■	■		■			■	■			Automotive casting (e.g. cylinder heads, engine blocks)	W	■	■	■	■	••	Reduced retaining dust in casting	1.3

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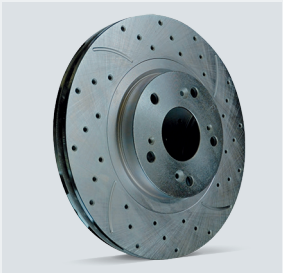
Highlights

MIRATEC Top Surface Technology for clean engine block casting

- Easy to peel off the coating in casting geometries that are difficult to access
- Cost savings due to reduced cleaning efforts
- Suppression of casting defects like veining, penetration and/or gas porosity

MIRATEC HY coatings solutions offer the advantages of the well-known SOLITEC HY for large serial casting production

- Fast drying when diluted with water
- Flammable after dilution with isopropanol or ethanol
- No transport or storage restrictions as compared to alcohol-based coatings



MIRATEC coatings highlights

Product	Color	Application				Binder					Metals						Application	Properties							
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate / Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metallization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
MIRATEC AC 503		■		■			■	■								■	Aluminium casting (e.g. engine blocks)	W					••	Excellent release properties	1.5
MIRATEC TS 416		■					■							■			Automotive casting (e.g. cylinder heads, brake disks)	W	■	■	■	■	•	Short matting time, Reduced retaining dust in casting	1.3
MIRATEC MB 422 / 522	div.	■		■		■	■	■					■	■			Universal coating newest generation	W	■	■	■	■	••	With / without grafit content available	1.3
MIRATEC TS 417		■					■	■		■			■	■			Automotive casting (e.g. cylinder heads, engine blocks)	W	■	■	■	■	••	Short matting time, Reduced retaining dust in casting	1.3

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SOLITEC

Water-based coatings for brushing, spraying or flow coating application

SOLITEC coatings are highly recommended for flow coating big and/or complex geometries. SOLITEC coatings impress with the shortest drying times in their application area. The coating is offered in several innovative color-changing formulations that represent a visual wet/dry-indicator. This unique characteristic ensures the integrity of the coating within the production process. Additionally, high performance formulations (e.g. zircon-free, sulphur stop, burn-in barrier) vastly improve the surface finish, which leads to reduced cleaning costs.

Benefits

- Short air-drying time and enhanced refractoriness
- Excellent application properties
- Fewer casting defects and excellent casting surfaces

Image:
A large wind energy hub casting

SOLITEC coatings

Product	Color	Application				Binder					Metals							Application	Properties								
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate/Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metallization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
SOLITEC HI 703		□	■	■	■	■			■	■			■	■	■		Heavy casting (e.g. wind power rotor hubs, water- and steam-operated turbines)	W		■			•	High degree of refractoriness; disables grafite degeneration; zircon-free	1.8
SOLITEC IM 702		■	■	■	■	■	■	□	■	■	■	■	■	■	■		Steel- & Heavy casting (e.g. machine platforms, naval Diesel engines)	W		■			••	Impregnating coating; zircon-free	1.9
SOLITEC ST 901			■	■	■		■	■	■	■	■	□	■	■	■		Heavy casting (e.g. wind power rotor hubs)	W	□	■			○		
SOLITEC ST 801		■	■	■	■					■	■	□	■	■	■		Heavy & steel casting (e.g. pump housings)	W	□	■			○	Zircon-free	2.0
SOLITEC WP 401			■	■	■		■	■	■	■			■	■		□	Heavy casting (e.g. wind power rotor hubs, water- and stream-operated turbines)	W	■	■			○	Fastened drying on air; adapted application; zircon-free	1.5

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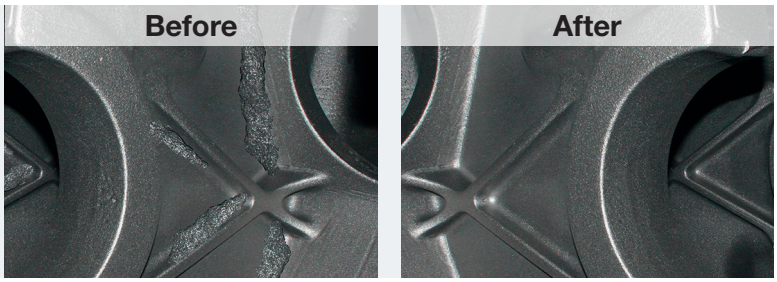
Highlights

SOLITEC HY Hybrid coating technology

- Fast drying when diluted with water
- Flammable after dilution with isopropanol or ethanol
- Provides sulphur stop for DI
- Up to 50 % cost savings compared to conventional coatings



SOLITEC highlights

Product	Color	Application				Binder					Metals						Application	Properties							
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate / Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metallization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
SOLITEC HY-Series			■	■	■	■	■	■	■	■			■	■		□	Universal coating (e.g. machine housings)	W	■	■			○	Alcohol-dilutable	
SOLITEC WP 401			■	■	■		■	■	■	■			■	■		□	Heavy casting (e.g. wind power rotor hubs, water- and stream-operated turbines)	W	■	■			○	Fastened drying on air; disables grafite degeneration; zircon-free	1.5

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Special applications

SOLITEC CC – Centrifugal die coatings

- Excellent insulating properties
- Reduced wear-off of the die
- Good pulling / extraction properties

SOLITEC MS – Coatings for permanent molds and tools

- Prevents slag adhesions to melt-carrying equipment
- Excellent brushing properties
- Excellent suspension properties

SOLITEC AD – Gravity die coatings

- Long life of die
- Excellent separating properties of the layer
- Smooth surface
- Universal coating

SOLITEC coatings for special apllications

Product	Color	Application				Binder					Metals						Application	Properties							
		Dipping	Flowcoating	Spraying	Brushing	Epoxy-SO_2	Cold Box	Hot Curing System	Silicate / Resol-CO_2	No-Bake	Steel	Manganese steel	GI	DI	Copper	Aluminium	Typical application	Solvent	Veining suppression	Metallization protection	High gas permeability	High layerforming possible	Matting time	Special effects	Density (undiluted) g/cm³
SOLITEC AD-Series				■	■											■	Aluminium - permanent die casting	W						Long life of die; clean casting surfaces	
SOLITEC CC-Series				■	■				■	□	■	■		■	■		Centrifugal casting	W		■	■	■		Different insulating properties adjustable	
SOLITEC MS-Series		■	■	■	■								■	■	■		Ladle and pouring spoon	W						Reduces slag adherence	

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CERAMCOTE

The multifunctional high-performing water-based coating

CERAMCOTE coatings were specifically designed for the Lost Foam and Full Mold technologies. A staple within the industry, CERAMCOTE provides superior performance and consistency to the automotive and non-automotive markets. Utilizing a special proprietary formulation, ASK Chemicals has optimized the rheological properties of CERAMCOTE (i.e. viscosity and layer thickness). Stable viscosity determines the evenness of the coating layer to prevent casting defects such as metal penetration, burn-on defects, cracks and scabs. CERAMCOTE offers superior bond strength and ductility. The dried coating can withstand even the most severe mechanical stress during sand compaction. This coating line is available for the following application methods: brushing, spraying, flow coatings and dipping.

Benefits

- Tailored permeability and insulating characteristics
- Adopted strength, ductility (dried coating) and rigidity

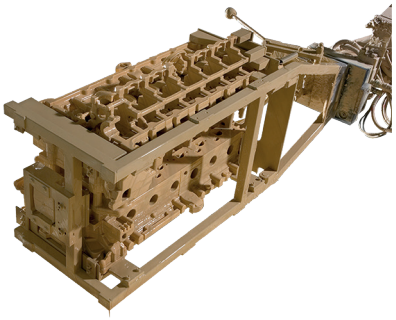
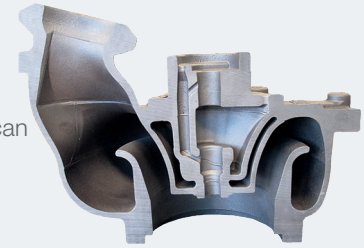


Image:
Lost Foam mold for the automotive industry

Highlights

CERAMCOTE coatings offer excellent insulating characteristics

Thanks to its formulation, the dried coating layer of CERAMCOTE lost foam coatings offers excellent insulating characteristics. Together with the fact, that the gas permeability can be controlled on a high or low level, these are ideal pre-conditions for the production of thin-walled casted parts.



CERAMCOTE coatings**

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CERAMCOTE AL-Series		■	■	■	■											■	Full Mould and Lost Foam Process	W	■	■	■	■	•	Excellent application properties	1.4
CERAMCOTE FS 402		■	■	■	■								■	■			Full Mould and Lost Foam Process	W	■	■	■	■	•	Excellent application properties	1.7
CERAMCOTE FS 503		■	■	■	■						■	■	■	■			Full Mould and Lost Foam Process	W	■	■	■	■	•	Excellent application properties	1.8

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** This table only shows a selection of 2 coatings as an example. Generally CERAMCOTE AL and FS coatings are used for Lost Foam applications in projects in order to adjust and coordinate sand, EPS, casting part geometry and ingate system etc. for a tailor-made customer-specific solution.

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 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 ASK Chemicals to replicate the process on the customer's own premises, 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 current processes
- 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 engineers have a wide range of experience and a clear understanding of all aspects of foundry technology and metallurgy. 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

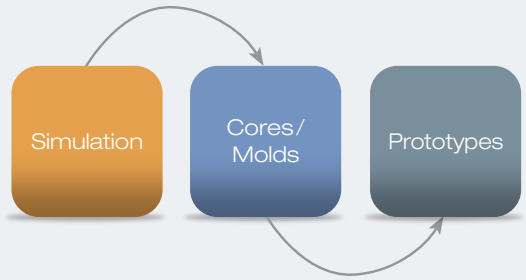
- Higher productivity and optimized catalyst consumption
- Manufacturing process design, including inorganic technology
- Calculation of optimal feed
- Optimized design and manufacture of model plates, core boxes and molds
- Less scrap
- Shorter product launch times
- Quicker time to market

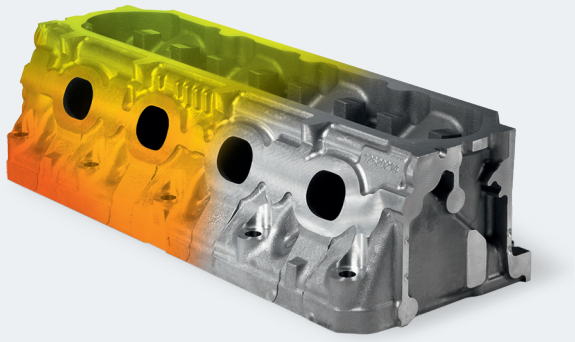
Simulation services

The simulation of casting processes provides foundries with invaluable casting mold information. Specifically, this benefit allows for the optimization of gating 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. Your benefit: you enjoy wide-ranging expertise from a single source.





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 chemical and polymer analysis
- Product, process and test method development

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