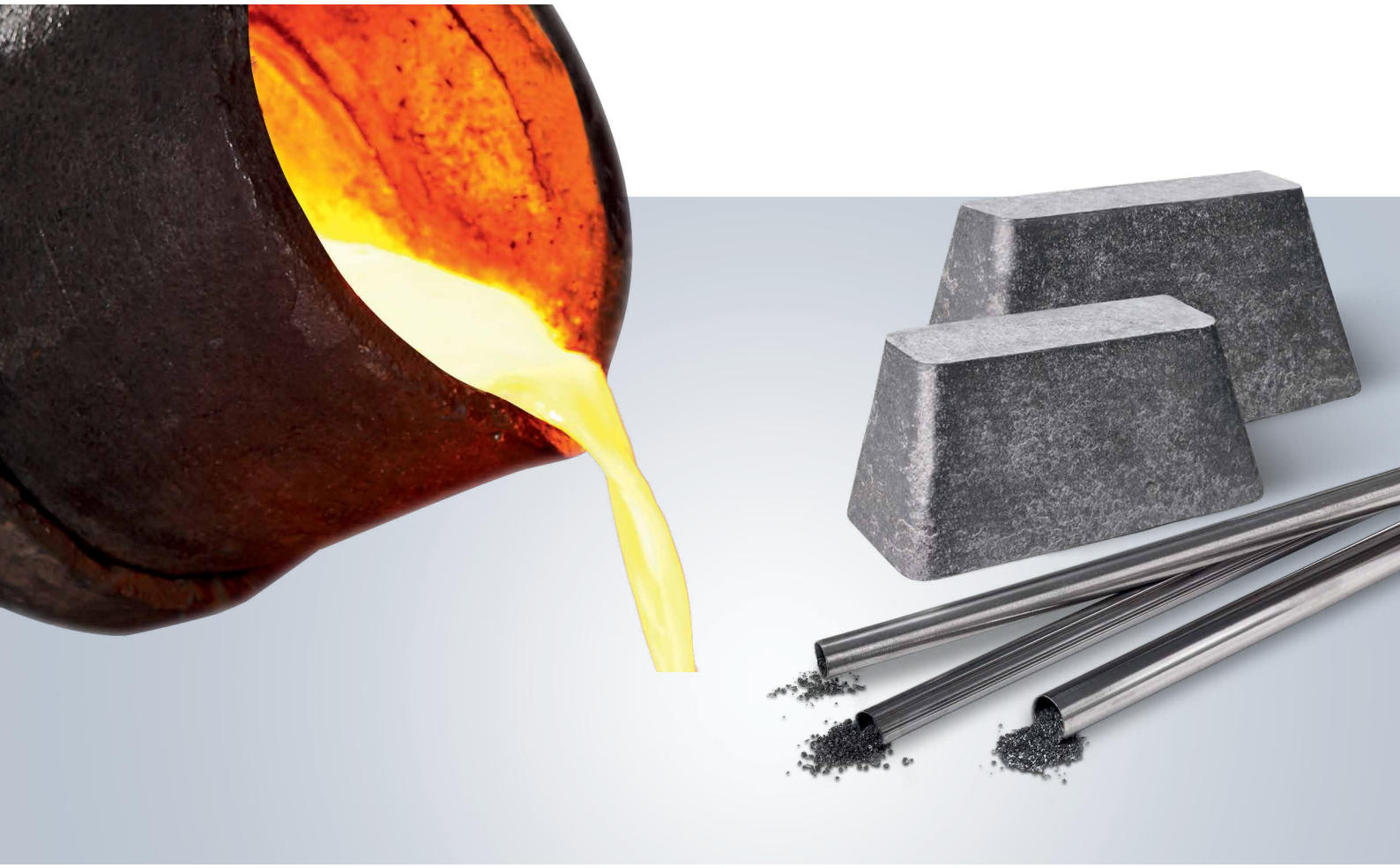
Metallurgy

Product Overview



BAS
Bavaria Alloys Systems

Constant Quality for Consistent Casting Results

Bavaria Alloys Systems (BAS) supplies and manufactures high- quality metallurgical products for global foundry production. From furnace-based applications to late inoculation inputs, our holistic products for iron casting provide guaranteed and consistent results. In addition, our metallurgists are true experts in their field. They work in close collaboration with Research & Development to launch new solutions on the market and to enhance current products to ensure lasting customer value.

At Bavaria Alloys Systems (BAS) 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.

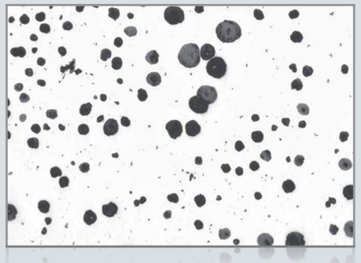
In addition, we offer our customers a holistic approach that goes well beyond merely offering products. Our application technology and technical sales specialists, in particular, always assess the production process as a whole. Only this approach allows for customer-specific solutions that are precisely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

- Constant qualities
- In-house metallurgical production
- Global logistics
- Extensive product portfolio
- Holistic value added services

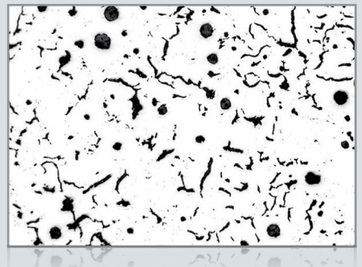
Basic Information

Iron compositions by group

Gray Cast Iron **GI**



Ductile Iron **DI**



Compacted Graphite Cast Iron **CGI**

Product overview

Melting shop	Melt preparation	SiC, FeMn, FeSi
Melt treatment	Pre-conditioning	DISPERSIT, Cerium misch metal (CerMM), VL (Ce) 2
	Mg treatment	FeSiMg – Master alloy, NiMg – Master alloy INFORM – Mg treatment wires
	Inoculation	Ladle inoculants, Cored wire, In-stream inoculants, Mold inoculants GERMALLOY, OPTIGRAN, SMW Insert
	Melt cleaning	REMMOS, DISPERSIT
	Specialties	CerMM, FeS, Mold powder, CaC_2

General applications of metallurgical products

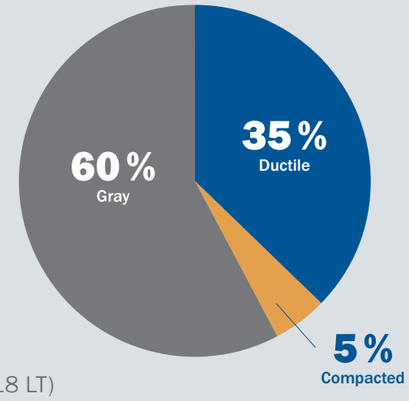
- Adjust iron composition
- Constant casting qualities
- Guarantee and improvement of quality and mechanical properties

Benefits of iron types

Within iron-producing foundries there are three primary forms of iron produced: gray, ductile & compacted.

➤ Gray Cast Iron **GI**

- Excellent vibration-damping properties
- Very good casting properties
- Inexpensive to manufacture
- Very good machining behavior



➤ Ductile Iron **DI**

- Versatile mechanical properties, e.g. ferritic types of cast iron with high elongation and toughness (DI-400-18 LT) or pearlitic types of cast iron with a high tensile strength (DI-800-2)
- Lower costs compared to steel with approximately the same mechanical properties

➤ Compacted Graphite Cast Iron **CGI**

- Withstands high application temperatures in combination with good thermal shock resistance
- Higher tensile strength, yield strength and elongation than that of GI
- Possibility of reduced wall thicknesses saves weight compared to GI

Custom solutions

Apart from the system solutions mentioned in this brochure, Bavaria Alloys Systems (BAS) also offers you custom solutions to fit your individual process. Please contact us to discuss your specific needs.

Pre-conditioners

Products that ensure a well-prepared base iron

Preconditioning establishes constant conditions in the molten metal. It is important to achieve a proper chemical composition of oxygen and sulfur, especially for the subsequent Mg-treatment processes. It is of upmost importance to achieve process stability, create a uniform base iron and improve the nucleation state of the molten metal. With the pre-conditioning products Bavaria Alloys Systems (BAS) provides, all of this can be achieved. Bavaria Alloys Systems (BAS) has a wide array of products within this segment to meet your every need.

Benefits

- Improves process stability
- Ensures a uniform base iron

Defect-inhibiting additive

DISPERSIT is an additive used primarily in the production of ductile iron. Relatively small addition levels can reduce slag and dross in your ductile iron. This product helps to keep ladle and furnace linings clean and free of slag.

Bavaria Alloys Systems (BAS) pre-conditioner products

Pre-conditioner	Iron	Application	Benefits
Calcium Carbide	DI	Furnace / Ladle	Desulfurizes, successfully used for covering FeSiMg during treatment
VL (Ce) 2	DI	Ladle	Reduces O_2 and S content in the base iron; forms atmospherically stable Ce-O-S compounds; boosts heterogeneous nucleation catalyst
DISPERSIT	DI, GI	Ladle	Purification of molten metal; reduction of slag on the ladle and furnance lining; reduction of dross and slag inclusions
SilicoMM	DI, CGI	Ladle	Adjusts CerMM content; provides a pre-inoculation effect, i.e. improves nucleation characteristics of iron; produces iron that is more responsive to post-inoculation
CerMM	DI, CGI	Ladle	Introducible with alloy or as whole cubes; good at graphite modification; neutralization of interfering elements like lead, antimony, etc.

Master alloys

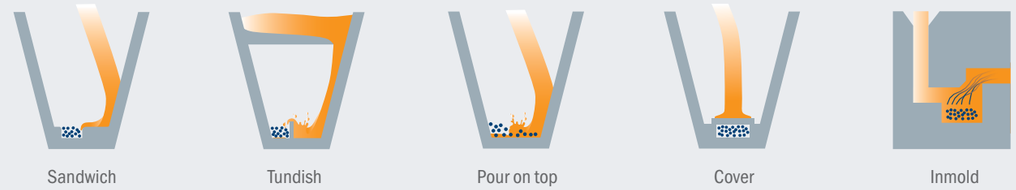
FeSiMg and NiMg

Magnesium treatment is a required step within the production of ductile (DI) iron and compacted (CGI) iron. The primary purpose of introducing magnesium to the molten metal is the formation of spherical graphite, also called spheroids or nodules (DI) and compacted graphite (CGI) respectively. These graphite forms, when produced correctly, are essential to provide the iron with the desired mechanical properties.

Benefits

- Produced to the highest quality standards
- Critical elements maintained at narrow limits

Methods for introducing the pre-alloy



Master alloys

FeSiMg type*	Typical composition				
	% by weight				
	Mg	Ca	CerMM	Si	La
VL 63 (M)	6.0 – 6.6**	1.9	0.7	45	–
VL 63 (O)	6.0 – 6.6**	1.9	–	45	–
VL 63 (M) TC	6.4 – 7.0	1.3	0.7	45	–
VL 63 (M) 3	6.0 – 6.6**	1.9	0.3	45	–
VL 63 EGT	6.0 – 6.6	1.9	0.15	45	–
VL 63 (M) T	6.0 – 6.6	3.0	1.0	45	–
VL 63 LA	6.2 – 6.8	1.8	–	45	0.5
VL 73 (M)	7.0 – 7.6	2.5	2.5	45	–
VL 73 (O)	7.0 – 7.6	2.5	–	45	–
VL 7	5.7 – 6.3	0.7	0.5	45	–
VL 53 (M)	9.0 – 11.0	2.0	0.7	44	–
VL 53 (O)	9.0 – 11.0	2.0	–	44	–
VL 53 (S)	8.0 – 9.5	3.0	3.5	43	–
VL 50 (M)	5.0 – 5.5	1.9	0.7	45	–
VL 50 (O)	5.0 – 5.5	1.9	–	45	–
Noduloy 3	3.8 – 4.3	0.5	1.3	45	–
Denodul 5	5.0 – 6.0	1.5	2.5	45	–

* Separate analyses on request, ** Exception for grain size 0.125 – 1 mm: 5.4 – 6.0 % Mg

NiMg / type*	Typical composition						Lumpiness
	% by weight						
	Mg	C	Si	Fe	MM	Ni	mm
VL 1 (LC)	15 – 17.5	0.1 max.	2.0 max.	1.0 max.	–	Remainder	12 – 50 150 max.
VL 1 (M)	15 – 17.5	2.0 max.	2.0 max.	1.0 max.	1.0	Remainder	150 max.
VL 4 (M)	4.5 – 6.0	2.5 max.	2.5 max.	32 – 37	1.0	Remainder	Ingots 2.5 kg or 0.8 kg
VL 4 (O)	4.5 – 6.0	2.5 max.	2.5 max.	32 – 37	–	Remainder	

* Other VL types on request

Cored wire

INFORM M for magnesium treatment

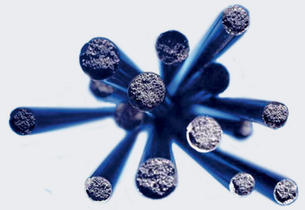
INFORM M cored wires are a highly effective and reliable method for introducing magnesium to molten metal. These highly innovative wires are designed in multiple diameters. They are extremely easy to handle and ideal for automation processes. Bavaria Alloys Systems (BAS) INFORM M cored wires are guaranteed to have been produced to the highest quality.

Benefits

- Well-adjusted compositions to your specific foundry needs
- Small addition and exact dosing
- Simple handling, easy to automate
- Good traceability and documentation

Mg cored wire treatment for DI and CGI

This offers flexibility with regard to changing initial conditions such as the sulfur content, treatment temperature, and iron quantity. Additionally, relatively constant Mg values can be achieved despite different initial sulfur values and treatment temperatures. Lastly, handling and treatment costs can be reduced. Environmentally friendly because of targeted exhausting.



Classification of Mg-treatment wires

Wire content	Diameter	Base iron	Application
Pure magnesium	9 mm, 13 mm	Cupola furnace iron (S_A* = 0.030 – 0.120 %) Electric furnace iron (S_A** = 0.010 – 0.030 %)	DI, desulfurization
Mixed (Alloys and / or pure elements)	9 mm, 13 mm, 16 mm	Cupola furnace iron (S_A* = 0.030 – 0.120 %) Electric furnace iron (S_A* = 0.010 – 0.030 %)	CGI, DI, desulfurization
Alloys	9 mm, 13 mm, 16 mm	Electric furnace	CGI, DI

* S_A = initial sulfur content

Inoculants

Ladle, in-stream and cored wire for varying applications

Bavaria Alloys Systems (BAS) offers a wide variety of engineered inoculants for gray (GI), ductile (DI) and compacted graphite (CGI) iron. Each inoculant is unique in design to provide performance characteristics that satisfy today's demanding casting requirements. These inoculants are produced at our German facility under strict quality control.

Benefits

- Very good dissolution behavior
- High effectiveness and low consumption
- Uniform graphite precipitation
- Improvement of mechanical properties

Methods for introducing the inoculants

Active elements of the inoculants and recommended field of application

Active elements	DI and GI		DI		GI	CGI
Al	Inogen 75		VP 216 / 116 (GERMALLOY)		–	Inogen 75
Ca			–		–	
Ba	SB 5 / SB 10	Inoculoy 63	–		–	–
Mn	ZM 6		–		VP 316 (OPTIGRAN)	–
Zr		OPTINOC Z	–		–	
Ca	–		SMW 605 (SMW Formling Typ 1)	–	–	–
Bi	–	–		SAW 304 (SMW Formling Typ 2)	–	–
CerMM	–	CSF 10			–	–
Al	–	–	–		–	–
La	–	LSF 2	–		–	–
Sr	SRF 75	–	–		–	SRF 75
Ti	–	–	–		LC Graphidox	LC Graphidox

Mold inoculants

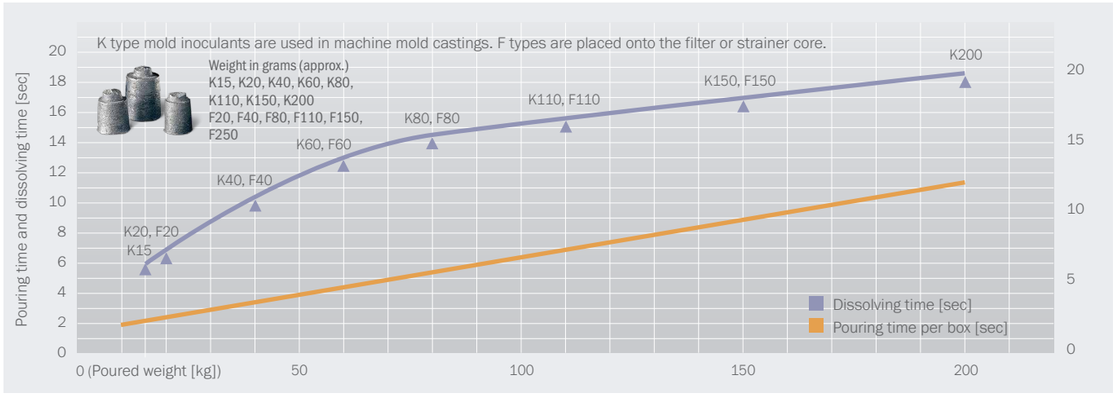
GERMALLOY, SMW Inserts and OPTIGRAN

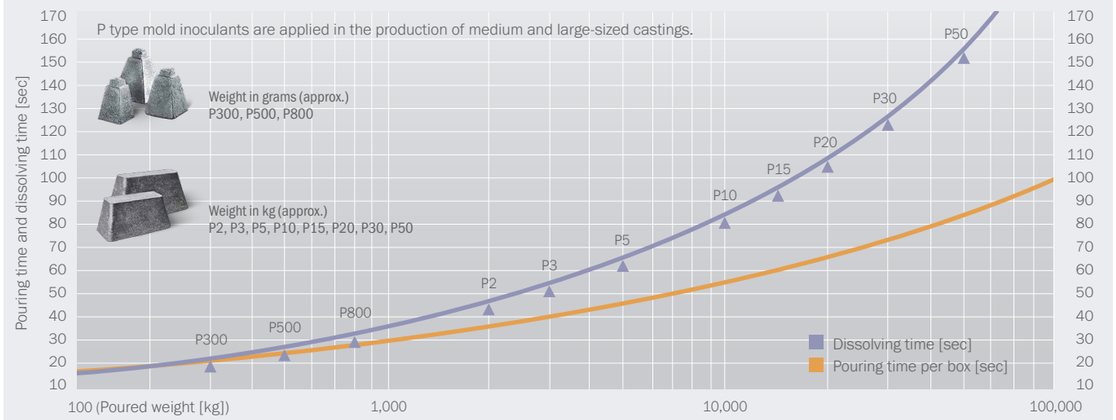
GERMALLOY and SMW Insert are solid cast inserts used for the mold inoculation of ductile iron. They are either placed in the drag portion of the mold or anchored in the pouring basin of very large castings. GERMALLOY is widely used to improve the nodule count of graphite within a casting, as well as enhance its mechanical properties. SMW Insert inoculants, on the other hand, are well known for their ability to eliminate the formation of chunky graphite in heavy section ductile iron. OPTIGRAN is the mold inoculant for gray iron. It provides finer Type “A” graphite in gray iron.

Benefits

- Addition rate well adjusted to casting size
- No contact to atmosphere during dissolving
- No fading of inoculating effect
- Higher nodule count in DI
- Ductile iron DI-400-15 & DI-400-18 as cast
- SMW Insert prevents chunky graphite

Pouring and dissolving time of Bavaria Alloys Systems (BAS) mold inoculants*





* Dissolving time depends on poured weight.

Added Value for our Customers

Application technology and technical sales – for complete process transparency

Application technology and technical sales at Bavaria Alloys Systems (BAS) 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. Bavaria Alloys Systems (BAS) 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

The following marks are registered by Bavaria Alloys Systems (BAS) GmbH in one or more countries:

DENODUL, DISPERSIT, GERMALLOY, INFORM, OPTIGRAN, REMMOS, SMW-INSERT.

Bavaria Alloys Systems (BAS) GmbH
Fabrikstraße 6
84579 Unterneukirchen, Germany

Phone +49 8634 7408
E-Mail customer-service@bavaria-alloys.com
Web bavaria-alloys.com

Thomas Feichtner, Commercial Director
Phone +49 171 752 6904
E-Mail thomas.feichtner@bavaria-alloys.com

Dr. Lars Martens, TL Technical Service
Phone +49 151 56728562
E-Mail lars.martens@bavaria-alloys.com

BAS
Bavaria Alloys Systems