

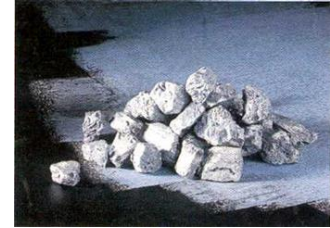


Pre-Alloy 1

FeSiMg pre-alloys for the treatment of molten iron for the production of GJS

Technical properties & economic benefits

- Production with high quality claims
- Compliance with tight analysis limit values of all important elements such as Mg, CerMM
- Treatment units from a few kg to over 40 t



Application

The low-percentage magnesium pre-alloys are predominantly used in the over-molding method. The specified working conditions and operational requirements are decisive for the effective design of the treatment ladles and for the question of a cover for the pre-alloy filling. It can be advantageous to combine certain grain sizes and pre-alloy types. The grain size is to be coordinated to the claims of the treatment process, the treatment unit and the relevant operating conditions. Further application options are Mg treatment in the mold and the flow method.

Chemical analysis

VL type *	TYPICAL COMPOSITION				
	% 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 60 LA	5.6 – 6.2	1.0	-	45	0.45
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	-

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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					

Framework conditions

The coagulation and separation of reaction products that result primarily in mol-ten metal that is rich in gas and sulfur progresses only slowly and incompletely.

It is therefore recommended that the iron used is as clean as possible, as is to be obtained through selection of suitable application materials and smelting equipment or through suitable pretreatment.

If the base iron has a high sulfur content, there is an increased risk of MgS inclusions and a potential resulfurization.

If possible, the S content before the Mg treatment should not be above 0.02 %.

In the case of S contents > 0.02%, use of the VL 53 must be checked.

Treatment method

The use of a lean ladle is recommended. The ladles used should be kept separate depending on the material, GJS or GJL. We recommend creating a hollow space in the ladle base with a web or case for holding the granular pre-alloy.

In order to protect the pre-alloy filling against an undesired swirling, the pre-alloy should always be covered and the pouring stream not directed to it when filling the ladle. This is particularly important if you are working with a fine-grained pre-alloy.

At the same time, the start of the reaction will be delayed by covering the pre-alloy. Ideally, the ladle will already be filled before the start of the reaction. The following are usual as means of covering: dry casting chips, clean steel scrap, or ferrosilicon. Special variants of covering the VL are the trigger method and the cover method.

The grain size of the pre-alloy is to be measured in such way that grain rising in the molten iron can finish reacting before reaching the bath surface. This results in an optimization of the discharge.

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Magnesium discharge (MgA)

The discharge treatment occurs using analysis results and only provides meaningful values if actually representative samples of the molten iron are taken at definite time points before and after their treatment and these are reliably examined.

The sulfur contents and the Mg component verifiable in the iron are to be determined.

The following equation applies:

$$MgA = \frac{(0.76 \times \Delta S) + MgContent}{AdditionVL \times MgContentVL} \times Treatment - quantity$$

Example:

Sbasis:	0.015 %	Mg content:	0.045 %
Sfinal:	0.007 %	Mg content VL:	6 % = 0.06 kg/kg VL
Δ S:	0.008 %	Addition VL:	15 kg
Treatment quantity:	1,000 kg		

$$MgA\% = \frac{(0,76 \times 0,008\%) + 0,045\%}{15\text{kg} \times 0,06} \times 1000\text{kg}$$

$$MgA\% = 56,8$$

Supply

Grain sizes: The standard grain sizes of the pure-alloy types are adapted to the treatment methods.

- Standard grain sizes:
- 0.125 - 1 mm*
- 1 - 4 mm
- 4 - 10 mm
- 1 - 10 mm
- 10 - 30 mm

* In this grain size, the Mg content is approximately 10 % below the value indicated. See table "Chemical composition (reference analysis)"

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Exceptions:

- VL 63 EGT available in the grain size 1.2 – 30 mm only.
- VL 63 LA available in the grain size 1 – 4 mm / 4 – 30 mm only.
- VL 60 LA available in the grain size 0.3 – 2.5 mm / 3 – 25 mm only.
- Special grain sizes are available on request.

Packaging:

- 25 kg paper sacks on pallet
- 150 kg steel vats on pallet*
- 1000 kg big-bags on pallet
- The containers are covered with a protective film.

* For VL 53 only 125 kg.

Miscellaneous

The magnesium pre-alloys can be stored indefinitely in their original packaging. The effects of humidity are to be avoided. Relevant hazardous substance regulations must be complied with. Our Shipment Handling department can provide further information. Magnesium pre-alloys are not a hazardous substance as defined by transport regulations.