

NORTH STAR BLUESCOPE STEEL LLC Material Specification

Process Area: LMF	Number: AL 49.02
Material: Vanadium Substitute A	Effective Date: 01/16/18
Authorized By: Jim Fox	Review Date: 01/16/19

1.0 Application:

Ladle addition for processing purposes.

2.0 Chemical Analysis and Material Properties:

Element	Absolute min.	Preferred min.	Preferred max.	Absolute max.
Al ₂ O ₃	58%			66%
Vanadium / V ₂ O ₅	18%			25%
CaO			<1%	1.5%
SiO ₂			<1%	1%
Aluminum	10%			16%
Carbon			.1%	.2%
FeO			.2%	.5%
Na ₂ O				1.2%
MnO				1.2%
BO, Cr ₂ O ₃ , TiO ₂ , WO ₂ , Nb ₂ O ₅ , Mo, P ₂ O ₅ , F ₂			0.5%	1.0%

3.0 Packaging:

- 3.1 22 Ton Bulk Dump Truck - each shipment to be identified with lot number.
- 3.2 Supersack - ~3500lb. each on flatbed truck when ordered this way- each load to be identified with lot number
- 3.3 25 lb bags on winged pallets – when packaged this way.
- 3.4 The North Star BlueScope Steel Raw Material Number must appear on all shipping and billing paperwork.

4.0 Sizing:

1.5" X down

5.0 Certification and Control:

- 5.1 Each lot received to include statements of conformity and certification. These documents must be handed in at the scales and include:
 - Certification for Vanadium, SiO₂, Al₂O₃, Carbon, Aluminum and CaO. (May be Typical Chemistry)
 - Quantity
 - Name of material
 - Lot number
- 5.1 All chemical constituents not expressed but are contained in the subject material may not exceed 0.5% (except for Al) collectively. Any material lot exceeding 0.5% must have prior approval by purchasing before shipment is made and analysis included on certification.
- 5.2 Material is subject to inspection at North Star BlueScope Steel to test adherence to specification. All material supplied to this specification must be equivalent in all respects to the material on which approval was originally granted.

6.0 Relevant Industry Standards (e.g. ASTM):

N/A

7.0 Hazardous Material:

Prepared by: Kevin Jessing	Page 1 of 2
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If this material is hazardous or requires special handling or storage, this information must be clearly labeled on containers and shipping documents. MSDS Sheets must also be sent to purchasing manager for new materials.

8.0 Attachments/Reference Documents:

N/A

Rev.	Date	Description of change	Reason for change:
	12/07/11	Reviewed and reauthorized	Annual review
	12/14/12	Reviewed and reauthorized	Annual review
	12/17/13	Reviewed and reauthorized	Annual review
	11/20/14	Reviewed and reauthorized	Annual review
	10/22/15	Reviewed and reauthorized	Annual review
	01/04/17	Reviewed and reauthorized	Annual review
	01/16/18	Reviewed and reauthorized	Annual review