

***NORTH STAR BLUESCOPE STEEL LLC* Material Specification**

Process Area: LMF	Number: AL 33.11
Material: High Residuals Ferrovanadium (FeV)	Effective Date: 01/16/18
Authorized By: Jim Fox	Review Date: 01/16/19

1.0 Application:

Ladle addition for alloying purposes.

2.0 Chemical Analysis and Material Properties:

Element	Absolute min.	Preferred min.	Preferred max.	Absolute max.
Vanadium	42.0%			49.0%
Carbon				1.00%
Phosphorous				0.4%
Sulfur				0.4%
Silicon				12.0%
Aluminum				10.0%
Manganese				5.50%
Nickel				3.00%
Chromium				6.00%

3.0 Packaging:

- 3.0 10 lb. contained V (all sizing / forms for manual additions) in metal cans, 1000-1500 contained V lbs/pallet, banded to winged pallets that have horizontal slats extending beyond the vertical 2x4 main members (wings) to facilitate lifting via pallet chain / bar lifting rig. Packages must be stenciled with the North Star BlueScope Raw Materials Number (AL12), contained V weight (lbs) per package, and material name (abbreviated) when ordered this way.
- 3.1 3000 – 4400 lb bulk weight supersacks (all sizing and forms approved for bulk addition use) polymesh sacks with lifting loops at top 4 corners and no bottom spout (flat bottom) packages must be stenciled with North Star BlueScope Raw Materials Number (AL12), bulk weight (lbs) per package, and material name (abbreviated) when ordered this way
- 3.2 The North Star BlueScope Steel Raw Material Number must appear on all shipping and billing paperwork
- 3.3 Prefer shipped on flatbed but can take specified for tailgate delivery from van.

4.0 Sizing:

- 4.1 2" X Down 10% max retained – approved for manual or bulk addition

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, Carbon, Phosphorous, Sulfur, and Silicon.
 - 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

Prepared by: Jim Nevins	Page 1 of 2
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7.0 Hazardous Material:

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:

Appendix #1: MSDS Sheets

Rev	Date	Description of change	Reason for change:
	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
11	01/19/16	Changed structure to make uniform with other specs and modify packaging for use in new micro alloy system	Accommodate use in new alloy system
	01/04/17	Reviewed and reauthorized	Annual review
	01/16/18	Reviewed and reauthorized	Annual review