

## MASTER ALLOYS: Vanadium



### TECHNICAL DATA SHEET

Vanadium is a critical alloying element for the titanium industry that makes the resulting titanium alloy significantly stronger than commercially pure titanium while having the same stiffness and thermal properties.



**ReadingAlloys**  
*advanced engineered materials*<sup>®</sup>

### INTRODUCTION

Reading Alloys innovates and produces superior master alloys, specialty alloys and metal powder products renowned for high purity and specific material characteristics. From aerospace to medical, to military to electronics, applications that demand the ultimate in performance rely on Reading Alloys' products. The company is widely recognized for its expertise in aluminothermic smelting, induction melting, vacuum sintering, metal powder production and electron beam refining.

Recognized as a premier supplier in applications where ultimate quality is critical; Reading Alloys produces high-purity materials in accordance with a certified ISO 9001 / AS 9100 quality management system and tested by a Nadcap accredited analytical laboratory. Our company maintains comprehensive quality assurance processes and precision material characterization systems to support the continued development of our core master alloys and high-purity fine powders.

### APPLICATIONS

Most vanadium is used within the high-performance steel industry with a smaller amount in titanium alloy production. Vanadium has the ability to make both steel and titanium alloys stronger and lighter, making vanadium a critical additive in aerospace, aviation, automotive, shipping and construction applications. Of all the refractory metals, vanadium alloys produce high strength to weight ratios and are commonly added to steel and titanium parts in order to improve strength and resist corrosion.

Reading Alloys produces a wide variety of vanadium-aluminum master alloys for both the aerospace and non-aerospace industries. Aerospace applications include alloys for the production of critical jet engine and airframe components. Non-aerospace applications include medical implants, military hardware, sporting goods, and others. Whether the need is for alpha or alpha-beta phase titanium, Reading Alloys manufactures grades of aluminum/vanadium for all applications.

Reading Alloys unparalleled experience in master alloy design and manufacturing enables us to gain an in-depth understanding of customer specific material requirements and expectations.

Please contact us to review your requirements at [rai.sales@ametek.com](mailto:rai.sales@ametek.com)

Continuous product development may make it necessary to change product details without notice.



## MASTER ALLOYS: VANADIUM

Element %	15Al-85V	15Al-85V (Non Aerospace)	25Al-75V (High Nitrogen)	35Al-65V	35Al-65V with RU
<b>Aluminum</b>	13-17%	13-17%	22-17%	34-39%	31-38%
<b>Vanadium</b>	82-86%	82-86%	72-77%	60-65%	59-66%
<b>Iron</b>	0.50% Max	0.50% Max	0.45% Max	0.30% Max	0.45% Max
<b>Ruthenium</b>	--	--	--	--	4% Min
<b>Boron</b>	0.003% Max	--	0.003% Max	0.003% Max	0.005% Max
<b>Carbon</b>	0.10% Max	0.10% Max	0.15% Max	0.10% Max	0.18% Max
<b>Chromium</b>	0.10% Max	0.10% Max	0.10% Max	0.10% Max	0.10% Max
<b>Copper</b>	0.05% Max	0.05% Max	0.05% Max	0.05% Max	0.05% Max
<b>Lead</b>	--	--	--	0.01% Max	--
<b>Magnesium</b>	0.25% Max	--	0.25% Max	0.01% Max	0.25% Max
<b>Manganese</b>	0.05% Max	0.05% Max	0.05% Max	0.05% Max	0.05% Max
<b>Molybdenum</b>	0.15% Max	0.15% Max	0.15% Max	0.15% Max	0.15% Max
<b>Nickel</b>	0.05% Max	0.05% Max	0.05% Max	0.05% Max	0.05% Max
<b>Phosphorous</b>	0.035% Max	0.035% Max	0.035% Max	0.010% Max	0.035% Max
<b>Silicon</b>	0.50% Max	0.50% Max	0.30% Max	0.30% Max	0.30% Max
<b>Sulfur</b>	0.024% Max	0.02% Max	0.024% Max	0.010% Max	0.024% Max
<b>Tungsten</b>	0.02% Max	0.02% Max	0.015% Max	0.015% Max	0.015% Max
<b>Hydrogen</b>	0.01% Max	0.01% Max	0.010% Max	0.010% Max	0.010% Max
<b>Nitrogen</b>	0.05% Max	0.05% Max	0.5-1.1%	0.05% Max	0.05% Max
<b>Oxygen</b>	0.22% Max	0.25% Max	0.20% Max	0.10% Max	0.10% Max

  

<b>RAI ID#</b>	RAI-0009	RAI-0104	RAI-0013	RAI-0010	RAI-0086
<b>Standard Size*</b>	8 x 50 mesh	1/2" x down	1/4" x 70 mesh	1/4" x 70 mesh	1/4" x down
<b>Packaging**</b>	1000 lb open-head steel drums (55 gallon)	1000 lb open-head steel drums (55 gallon)	1000 lb open-head steel drums (55 gallon)	1000 lb open-head steel drums (55 gallon)	1000 lb open-head steel drums (55 gallon)

\* Other sizes available upon request.

\*\* Other packaging available upon request.

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## MASTER ALLOYS: VANADIUM

Element %	35Al-65V (Non Aerospace)	50Al-50V	60Al-40V	19Al-11Fe-69V	40Ni-60V
<b>Aluminum</b>	Balance	44-50%	54-60%	17.5-20.5%	1.50% Max
<b>Vanadium</b>	60% Min	50-55%	40-45%	Balance	60% Min
<b>Nickel</b>	--	0.05% Max	0.05% Max	0.05% Max	35% Min
<b>Arsenic</b>	--	--	--	--	0.004% Max
<b>Boron</b>	--	0.003% Max	0.003% Max	0.003% Max	--
<b>Carbon</b>	0.25% Max	0.10% Max	0.10% Max	0.18% Max	0.05% Max
<b>Chromium</b>	--	0.10% Max	0.20% Max	0.10% Max	0.04% Max
<b>Copper</b>	--	0.05% Max	0.10% Max	0.05% Max	--
<b>Iron</b>	0.50% Max	0.40% Max	0.50% Max	10.0-12.0%	0.50% Max
<b>Lead</b>	--	--	--	--	0.001% Max
<b>Magnesium</b>	--	0.25% Max	0.05% Max	0.25% Max	--
<b>Manganese</b>	--	0.05% Max	0.05% Max	0.05% Max	--
<b>Molybdenum</b>	0.25% Max	0.15% Max	0.30% Max	0.20% Max	0.04% Max
<b>Niobium</b>	--	0.01% Max	--	--	--
<b>Phosphorous</b>	0.04% Max	0.03% Max	0.02% Max	0.035% Max	--
<b>Selenium</b>	--	--	--	--	0.002% Max
<b>Silicon</b>	0.40% Max	0.35% Max	0.50% Max	0.30% Max	0.30% Max
<b>Silver</b>	--	--	--	--	0.001% Max
<b>Sulfur</b>	0.03% Max	0.02% Max	0.03% Max	0.024% Max	0.03% Max
<b>Tantalum</b>	--	0.005% Max	--	--	--
<b>Tin</b>	--	--	--	--	0.003% Max
<b>Tungsten</b>	--	0.015% Max	0.05% Max	0.015% Max	--
<b>Yttrium</b>	--	0.005% Max	--	--	--
<b>Hydrogen</b>	--	0.01% Max	0.015% Max	0.010% Max	--
<b>Nitrogen</b>	0.1% Max	0.04% Max	0.05% Max	0.05% Max	0.05% Max
<b>Oxygen</b>	0.25% Max	0.10% Max	0.10% Max	0.12% Max	0.40% Max

<b>RAI ID#</b>	RAI-0087	RAI-0011	RAI-0012	RAI-0118	RAI-0022
<b>Standard Size*</b>	3 1/2" x down	1/4" x 50 mesh	1/4" x 50 mesh	1/4" x down	2" x down
<b>Packaging**</b>	1000 lb open-head steel drums (55 gallon)	1000 lb open-head steel drums (55 gallon)	800 lb open-head steel drums (55 gallon)	1000 lb open-head steel drums (55 gallon)	500 lb open-head steel drums (17 gallon)

\* Other sizes available upon request. \*\* Other packaging available upon request. Continuous product development may make it necessary to change product details without notice.



### Leader in Innovative and Advanced Metallurgical Technologies

Reading Alloys serves a wide range of applications such as aerospace, turbines, medical, electronics and others.



### AMETEK Specialty Metal Products at a Glance

Reading Alloys is a unit of AMETEK Specialty Metal Products (SMP) operating within the Engineered Materials division of AMETEK Inc, a leading global producer of electronic instruments and electromechanical devices.

AMETEK SMP is a leading manufacturer of advanced metallurgical products including high purity powders, master alloys, precision metal tube, strip and foil. These products are manufactured at six operating facilities in the United States and the United Kingdom for a variety of critical applications, including aerospace, automotive, defense, electronics, energy, medical, general industrial and oil and gas.



## A Tradition of Excellence

Reading Alloys was founded in 1953 on the principles of excellence in applied metallurgical research and development. We have always been driven by a commitment to research and technical expertise. Our adherence to our founding goals has enabled us to offer our customers a flexible range of technical options and R&D partnerships to meet the most demanding product requirements. This commitment has driven Reading Alloys to its current standing as a world leader in high-purity materials and technically advanced manufacturing and quality control processes.



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