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OMB Control Number: 0694-0120 Expiration Date: December 31, 2020





SCOPE OF ASSESSMENT

The U.S. Department of Commerce, Bureau of Industry and Security (BIS), Office of Technology Evaluation (OTE), is conducting a survey of the U.S. vanadium industry. The survey results will be used to support an ongoing investigation on the effect of imports of vanadium products on the U.S. national security initiated under Section 232 of the Trade Expansion Act of 1962, as amended.

The principal goal of this survey is to assist the U.S. Department of Commerce in determining whether vanadium imports are being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security. Information collected will include facilities and production data, capacity utilization, customers, sales and demand data, employment information, conditions of domestic and global competition, research and development, and other factors. The resulting data will provide the U.S. Department of Commerce detailed vanadium industry information that is otherwise not publicly available and needed to effectively conduct this Section 232 investigation.

RESPONSE TO THIS SURVEY IS REQUIRED BY LAW

A response to this survey is required by law (50 U.S.C. Sec. 4555). Failure to respond can result in a maximum fine of \$10,000, imprisonment of up to one year, or both. Information furnished herewith is deemed confidential and will not be published or disclosed except in accordance with Section 705 of the Defense Production Act of 1950, as amended (50 U.S.C. Sec. 4555). Section 705 prohibits the publication or disclosure of this information unless the President determines that its withholding is contrary to the national defense. Information will not be shared with any non-government entity, other than in aggregate form. The information will be protected pursuant to the appropriate exemptions from disclosure under the Freedom of Information Act (FOIA), should it be the subject of a FOIA request.

Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number.

BURDEN ESTIMATE AND REQUEST FOR COMMENT

Public reporting burden for this collection of information is estimated to average 10 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information to BIS Information Collection Officer, Room 6883, Bureau of Industry and Security, U.S. Department of Commerce, Washington, D.C. 20230, and to the Office of Management and Budget, Paperwork Reduction Project (OMB Control No. 0694-0120), Washington, D.C. 20503.

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

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	General Instructions
	Your organization is required to complete this survey of the U.S. vanadium industry, which can be downloaded from the BIS website: http://www.bis.doc.gov/Vanadium232
А.	If you are unable to download the survey document, at your request, BIS survey support staff will e-mail the Excel survey template directly to you.
	For your convenience, a PDF version of the survey and required drop-down content is available on the BIS website to aid internal data collection. DO NOT SUBMIT the PDF version of the survey as your response to BIS. Should this occur, your organization will be required to resubmit the survey in the requested Excel format.
	Respond to every question. Surveys that are not fully completed will be returned for completion. Use the comment boxes to provide any information to supplement responses provided in the survey form. Make sure to record a complete answer in the space provided, even if the space does not appear to expand to fit all of the information.
В.	DO NOT CUT AND PASTE RESPONSES WITHIN THIS SURVEY OR PASTE IN RESPONSES FROM OUTSIDE THE SURVEY. Survey inputs should be completed by typing in responses or by using a drop-down menu. The use of cut and paste can corrupt the survey template. If your survey response is corrupted as a result of cut and paste response, your survey will be rejected and your organization must immediately resubmit the survey.
C.	Do not disclose any USG classified information in this survey form.
D.	Upon completion of the survey, final review, and certification, transmit the survey document via e-mail to: Vanadium232@bis.doc.gov
	Questions related to the survey should be directed to BIS survey support staff at Vanadium232@bis.doc.gov
E.	E-mail is the preferred method of contact.
	You may speak with a member of the BIS survey support staff by calling (202) 482-5481.
	For questions related to the overall scope of this Section 232 Investigation, contact <u>Vanadium232@bis.doc.gov</u> or:
	Jason D. Bolton Program Manager, Industrial Studies
_	BIS/Export Administration/Office of Technology Evaluation
F.	1401 Constitution Avenue, NW, Room 1093
	Washington, DC 20230
	DO NOT submit completed surveys to Mr. Bolton's postal or personal e-mail address. All surveys must be submitted electronically to: Vanadium232@bis.doc.gov
	BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

	Definitions
Term	Definition
Authorizing Official	An executive officer of the organization or business unit or another individual who has the authority this survey on behalf of the organization.
Capital Expenditures	Investments made by an organization in buildings, equipment, property, and systems where the experiment of the expenditures for consumable materials, other operating expenses associated with normal business operations.
Co-Production	The process of extracting vanadium from titaniferous magnetite ores during steel production.
Critical Infrastructure	Sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to States that their incapacitation or destruction would have a debilitating effect on security, national security, national public health and safety, or any combination thereof.
Customer	Any organization (external or internal entity) for which your organization manufactures/processes a comprised of, or containing, steel in any form.
Defense-related Sales/Activities	Any product or service that your organization produces that is ultimately used by the U.S. Governm defense purposes, whether by the armed services, the Department of Defense, or any other U.S. Go entity.
Development	The design, simulation, and testing of a prototype, including experimental software or hardware systems prior to production approval.
Distributor	An independent selling agent who has a contract to sell the products of a manufacturer.
Exports	Shipments to destinations outside the United States.
Facility	A building or the minimum complex of buildings or parts of buildings that conduct steel production, organization operates to serve a particular function, producing revenue, and incurring costs for the facility may produce an item of tangible or intangible property or may perform a service. It may end floor or group of floors within a building, a single building, or a group of buildings or structures. Ofte a group of related locations at which organization employees work, together constituting a profit-au for the company, and it may be identified by a unique DUNS number.
Full Time Equivalent (FTE) Employees	Employees who work for 40 hours in a normal work week. Convert part-time employees into "full ti equivalents" by taking their work hours as a fraction of 40 hours.
Global Headquarters	A location that serves as the organization's hub of worldwide operations with all global branches or reporting to it.
Harmonized Tariff Schedule (HTS)	A 10-digit numbering system that classifies a good based on its name, use, and/or the material used construction. The number provides Customs and Border Protection (CBP) with a standardized meth all merchandise imported into the United States and sets out the tariff rates and statistical categories.
High Purity Vanadium Pentoxide	Vanadium pentoxide of at least 99% percent purity.
Import Value	Values reported should be landed, duty-paid values at the U.S. port of entry, including ocean freight insurance costs, brokerage charges, and import duties (i.e., all charges except inland freight in the U
Inventory	The goods or materials an organization holds for its own use or for the ultimate goal of sale.

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	Definitions
Term	Definition
Non-U.S. Facility	A facility that is physically located outside of the United States.
Organization	A company, firm, laboratory, or other entity that owns or controls one or more U.S. establishment o capable of designing and/or manufacturing steel products.
Primary/By-Product Production	The process of producing vanadium products from mining operations or in conjunction with mining of for other minerals.
Product/Process Development	Conceptualization and development of steel product or steel production techniques prior to the pro- the product for customers (i.e., utilities, governmental agencies etc.).
Production	The process of transforming inputs (raw materials, semi-finished goods, subassemblies, ideas, inform knowledge) into goods or services.
Research & Development	Basic and applied research in the engineering sciences, as well as design and development of prototy and processes. Efforts that an organization conducts towards innovating, introducing and/or improv and processes.
Sales	All reported and unreported sales of steel, including sales to end-users, producers, financial entities, intermediaries, traders, distributors, et al.
Secondary Production	The process of transforming waste materials (spent catalyst, slag, ash, residues, etc.) into vanadium including vanadium pentoxide, ferrovanadium, vanadium metals, and metal alloys that contain vana
Single Source	An organization that is designated as the only accepted source for the supply of parts, components, services, even though other source with equivalent technical know-how and production capability m
Sole Source	An organization that is the only source for the supply of parts, components, or services. No alternation non-U.S. based suppliers exist other than the current supplier.
Supplier	An entity from which your organization obtains inputs, which may be goods or services. A supplier m another organization with which you have a contractual relationship, or it may be another facility ow same parent organization.
Tipping/Recycling Fees	Fees collected for the recycling of waste or other vanadium-bearing products (Ash, Residues, Spent C Vanadium Slag, Etc.) into vanadium products. This includes fees collected by secondary vanadium products during the recycling of vanadium-bearing feedstocks into vanadium products.
Toll Production/Conversion Services	The process of converting one form of vanadium, typically vanadium pentoxide, into another form o typically ferrovanadium.
Tollee	The firm who furnished inputs (i.e. vanadium pentoxide) to the Toller for conversion into a different product (i.e. ferrovanadium).
Toller	The firm who converted/produced vanadium inputs (i.e. vanadium pentoxide) into a different vanad (i.e. ferrovanadium) for the Tollee.
Vanadium Master Alloys	Master alloys produced from high purity vanadium pentoxide, including Aluminum-Vanadium maste (often containing 35% aluminum and 64.5% vanadium).
United States	The "United States" or "U.S." includes the 50 states, Puerto Rico, the District of Columbia, Guam, the Territories, and the U.S. Virgin Islands.

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				1. Organiz	zation Inform	ation					
	Provide the following information for your o	rganization									
	Organization Name										
	Street Address										
	City										
	State										
Α.	ZIP Code										
	Country of Global Headquarters										
	U.S. Point of Contact Name										
	U.S. Point of Contact Email										
	U.S. Point of Contact Phone										
	Is this organization owned, in whole or in pa	rt by any oth	 ar antity? Indicate Vas/No. th	on identify the	antitias halo	v if annlica	blo				
	List entities with at least 5% ownership.	it, by any oth		ien identity the	entities belo		ibie.				
	List entities with at least 5% ownership.					Chala					
	Entity Name	Global Hea	dquarters Street Address	Global Headq	uarters City		l Headquarters	Global Headquarters Countr	y	Ownership %	
			•			Sta	ate/Province		-	•	
В.											
	Identify the vanadium products that your or	ganization cur	rently uses/sources and sells	/provides							
				, le	1			1			
	Subject Products					Uses/So	urces	Solls/Provides		JS Code (10-digit level)	
						•			Us	ed for Import/Export	
	Vanadium Ores and Concentrates										
	Vanadates					-					
	Vanadium Carbides					Domestica	· · ·				
	Vanadium Sulfates						lly and Import	Export Only			
C	Vanadium Hydrides, Nitrides, Azides, Silicides, and Borides				Not App	licable		Sell Domestically Only Sell Domestically and Export			
C.	Vanadium Pentoxide - Up to 99% purity										
	High Purity Vanadium Pentoxide - 99%+ purity							Not Applicable			
	Other Vanadium Oxides and Hydroxides (Excluding Pentoxide)										
	Vanadium-Bearing Feedstocks (Ash, Residues, Spent Catalysts, Vanadium Slag, Etc.)										
	Ferrovanadium - Under 80% Vanadium										
	Ferrovanadium - 80%+ Vanadium										
	Vanadium Master Alloys										
	Vanadium, Wrought and Unwrought (Exclud	ing Master Al	oys)								
	Other										
	At the global headquarters level, identify the	e total numbe	r of facilities that your organi	zation currently	y operates, in	cluding star	ndby/idle facilities, in	side and outside the U.S., that manu	Ifacture	and/or distribute any of	
	the subject products listed below.										
					Nu	imber of U.	S. Facilities	Number of Non	-U.S. Fac	cilities	
	Su	bject Product	S		Manufa		Distribute Only		Manufacture Distribute Only		
	Vanadium Ores and Concentrates						,			,	
	Vanadates										
	Vanadium Carbides										
	Vanadium Sulfates										
D.	Vanadium Hydrides, Nitrides, Azides, Silicide	s, and Borides	; ;								
υ.	Vanadium Pentoxide - Up to 99% purity	-									
	High Purity Vanadium Pentoxide - 99%+ puri	ty									
	Other Vanadium Oxides and Hydroxides (Exc	•	(ide)								
	Vanadium-Bearing Feedstocks (Ash, Residue		•								
	Ferrovanadium - Under 80% Vanadium										
	Ferrovanadium - 80%+ Vanadium										
	Vanadium Master Alloys										
	Vanadium, Wrought and Unwrought (Excluding Master Alloys)										
	Other	-	cify)								
		· ·			-			•			
	Comments:										
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<u>reviou</u>	<u>s Page</u>					2 Facilit	ty Information							<u>Next Pag</u>
					idle, on standby, or under construction licated for each product category su	on] are involved in the import	tation, distribution, productio	n, or exploration of va	vanadium pro	roducts.				
					der construction] involved in the imp n to standby or idle facilities, include									
							Current Operating Sta	us			titution from Idle/Shutdown	Future Operating St	tatus	
	Facility Name	City	State	Type of Facility	Product Category Supported	d Current Operating St	tatus (MM/DD/YYYY)	Primary Reaso Standby/Idle or Sł		Months to Reconstitute	Estimated Cost Reconstitute (Thousands US	Primary Change I	n 2020-	Comments
1		Primary/By-Product Production	1	7	Л	1		∧				1		
2		Secondary Production												
3		Co-Production Conversion Services				Operating		+						
5		Master Alloy Production				Idle/Standby							-	
6		Distribution Only	Vanadiu	um Ores and Concentrates		Under Construction						pansion ograde		
7	l	Other	Vanadat	ates				-				arting Operations		
8				um Carbides um Sulfates	-							starting Operations		
10				um Sunates um Hydrides, Sulfides, Nitrides,	Silicides, and Borides		Vanadium Price					andby/Idle gnificant Modernization		
11			Vanadiu	um Pentoxide - Up to 99% Vana	ldium		Loss of Market Share to Imports			Closure				
12				urity Vanadium Pentoxide - 99%			Competition				No	one		
13 14				/anadium Oxides and Hydroxide um-Bearing Feedstocks (Ash, Re	esidues, Spent Catalysts, Slag, Etc.		Declining Demand High Costs							
15			Ferrova	anadium - 40-60% Vanadium			Firm Restructuring							
16				anadium - 80%+ Vanadium um Master Alloys			COVID-19/Pandemic							
17				um, Wrought and Unwrought (I	Excluding Master Allovs)		Other							
18 19				/anadium-Related										
20					_									
	Briefly explain the sc	ope of your organization's vanad	ium-related ac	ctivities.	•			-	<u>I</u>					
		, , ,												
	For each identified fa	acility scheduled to incur a chang	e in operating	status in 2020-2023, describe t	he circumstances behind your decisi	ion.								
2														
	For each identified id	lle/standby facility scheduled [or	considering to	o schedule] for restart in 2020-2	2023, describe the circumstances bel	hind your decision.								
3														
	Comments:													
					DUCIN		tion 705(d) of the Defense Pro	duction Act						

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3a. U.S. Production

In Part A, identify which vanadium products your organization has capabilites in, or could develop capabilities. Provide the requested details on production requirements. In Part B, record the total annual quantity of each subject product your organization produced from 2016-2020 (YTD July). Remember to confirm the units of measurement organization is a tollee (i.e. provides material to a toller for conversion), do not record this production below.

If you only distribute and do not manufacture or plan to manufacture any of the subject vanadium products, indicate so here and move to the next section.

		Current Capability	If Interested/Idle, Time to Develop Capability (Months)	Investment Required to Develop Capability (Thousands USD)	Current Annua Production Capa (Kg contained)				
	Vanadium Ores and Concentrates								
	Vanadates	1							
	Vanadium Carbides								
	Vanadium Sulfates								
А.	Vanadium Hydrides, Nitrides, Azides, Silicides, and Borides		_						
А.	Vanadium Pentoxide - Up to 99% purity	Yes No							
	High Purity Vanadium Pentoxide - 99%+ purity	Idle							
	Other Vanadium Oxides and Hydroxides (Excluding Pentoxide)	Interested in Developin	g						
	Vanadium-Bearing Feedstocks (Ash, Residues, Spent Catalysts, Slag, Etc.)								
	Ferrovanadium - Under 80% Vanadium								
	Ferrovanadium - 80%+ Vanadium								
	Vanadium Master Alloys								
	Vanadium, Wrought and Unwrought (Excluding Master Alloys)								
	Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here:								
		U.S. Production (Kg contair							
		2016	2017	2010	2010				
		2016	2017	2018	2019				
	Vanadium Ores and Concentrates								
	Vanadates								
	Vanadium Carbides								
в.	Vanadium Sulfates								
	Vanadium Hydrides, Nitrides, Azides, Silicides, and Borides								
	Vanadium Pentoxide - Up to 99% purity								
	High Purity Vanadium Pentoxide - 99%+ purity								
	Other Vanadium Oxides and Hydroxides (Excluding Pentoxide)								
	Vanadium-Bearing Feedstocks (Ash, Residues, Spent Catalysts, Slag, Etc.)								
	Ferrovanadium - Under 80% Vanadium								
	Ferrovanadium - 80%+ Vanadium								
	Vanadium Master Alloys								
	Vanadium, Wrought and Unwrought (Excluding Master Alloys)								
	Comments:								
		E	BUSINESS CONFIDENTIAL	- Per Section 705(d) of the	e Defense Producti				
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t. If you	r organization toll-produces a	any material, include the	type and quantity produ	iced here. If your
l	Do not include data on subjec	t products that your org	anization only distributes	;.
ual bacity d V)	Expected Future (2023) Annual Production Capacity (Kg contained V)	Utilization Rate Required to Remain Profitable	Average Cost to Produce per Kg contained Vanadium	Price V2O5 per Kg Required to Continue Operations
- :) (/			
ained v	anadium)			
	2019 (YTD July)	2020 (YTD July)	Comr	nents
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tion Ac	t			

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3b. U.S. Sales and Exports

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For your organization's U.S. operations, answer the following questions about revenues, sales, and exports. Record Sales \$ in Thousands USD, e.g. \$12,000.00 = survey input of \$12. Average sales price per unit should be in USD. If your organization is a toll producer, do not include sales of third-party converted vanadium materials below; if your organization is a tollee, record any vanadium sales below.

	For your organization's U.S. operations, by subject product category, record complete this section.	rd both your U.S. sales a	and exports (shipments	from the U.S. to destina	tions outside the U.S.) f	rom 2016-2020 (YTD Jul	y). Distributors must
		Vanad	ium Ores and Concentra	ites			
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg						
	contained vanadium, indicate unit used here						
	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
Α.	U.S. Sales (Kg)						
	U.S. Sales (Thousands USD)						
	Average U.S. Sales Price per Kg (\$)						
	Export Sales (Kg)						
	Export Sales (Thousands USD)						
	Average Export Sales Price per Kg (\$)						
	Percentage of Total 2019 Sales Attributable to Product						
			Vanadates				
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here						
	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
В.	U.S. Sales (Kg)						

B. U.S. Sales (Kg)						
U.S. Sales (Thousands USD)						
Average U.S. Sales Price per Kg (\$)						
Export Sales (Kg)						
Export Sales (Thousands USD)						
Average Export Sales Price per Kg (\$)						
Percentage of Total 2019 Sales Attributable to Product						
		Vanadium Carbides				
Select 'Not Applicable' if category is not relevant to your operations						
Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here						
U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
C. U.S. Sales (Kg)						
U.S. Sales (Thousands USD)						
Average U.S. Sales Price per Unit (\$)						
Export Sales (Kg)						
Export Sales (Thousands USD)						
Average Export Sales Price per Unit (\$)						
Percentage of Total 2019 Sales Attributable to Product						

_							
			Vanadium Sulfates				
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg						
	contained vanadium, indicate unit used here						
	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
D.	U.S. Sales (Kg) U.S. Sales (Thousands USD)						
	Average U.S. Sales Price per Unit (\$)						
	Export Sales (Kg) Export Sales (Thousands USD)						
	Average Export Sales Price per Unit (\$)						
	Percentage of Total 2019 Sales Attributable to Product			•	•		
		Vanadium Hydrides	s, Nitrides, Azides, Silici	des, and Borides			
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here						
E.	U.S. and Export Sales U.S. Sales (Kg)	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
	U.S. Sales (Ng) U.S. Sales (Thousands USD)						
	Average U.S. Sales Price per Unit (\$)						
	Export Sales (Kg) Export Sales (Thousands USD)						
	Average Export Sales Price per Unit (\$)						
	Percentage of Total 2019 Sales Attributable to Product						
		Vanadium	Pentoxide - Up to 99%	6 purity			
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here						
	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
F.	U.S. Sales (Kg)	2010	2017	2010	2013		
	U.S. Sales (Thousands USD) Average U.S. Sales Price per Unit (\$)						
	Export Sales (Kg)						
	Export Sales (Thousands USD)						
	Average Export Sales Price per Unit (\$)						
	Percentage of Total 2019 Sales Attributable to Product		anadium Dantavida 0	00/1			
		nigh Punty v	anadium Pentoxide - 99	9%+ punty			
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg						
	contained vanadium, indicate unit used here					1	
G	U.S. and Export Sales U.S. Sales (Kg)	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
0.	U.S. Sales (Thousands USD)						
	Average U.S. Sales Price per Unit (\$) Export Sales (Kg)						
	Export Sales (Thousands USD)						
	Average Export Sales Price per Unit (\$)						
	Percentage of Total 2019 Sales Attributable to Product						
		Other Vanadium Oxid	des and Hydroxides (Ex	cluding Pentoxide)		•	
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here						
	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
н.	U.S. Sales (Kg)	2010	2017	2010	2013		
	U.S. Sales (Thousands USD) Average U.S. Sales Price per Unit (\$)						
	Export Sales (Kg)			 			
	Export Sales (Thousands USD)						
	Average Export Sales Price per Unit (\$) Percentage of Total 2019 Sales Attributable to Product		I	1	1		
		nadium Bearing Feedst	ocks (Ash Residue Sec	ent Catalysts Slag Etc.)			
			sens (Asin, Residue, Spe	catarysts, slag, ElC.)			
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg						
	contained vanadium, indicate unit used here	2010	2017	2010	2010		
١.	U.S. and Export Sales U.S. Sales (Kg)	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
	U.S. Sales (Thousands USD)						
	Average U.S. Sales Price per Unit (\$) Export Sales (Kg)						
	Export Sales (Thousands USD)						
	Average Export Sales Price per Unit (\$)			1	I		
	Percentage of Total 2019 Sales Attributable to Product						
		Ferrovana	adium - Under 80% Van	adium			
	Select 'Not Applicable' if category is not relevant to your operations						
	Record data in Kg contained vanadium. If unable to record data in Kg						
	contained vanadium, indicate unit used here U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
J.	U.S. Sales (Kg)	2010	2017	2010	2015		
	U.S. Sales (Thousands USD)						
	Average U.S. Sales Price per Unit (\$) Export Sales (Kg)						
	Export Sales (Thousands USD)			 			
	Average Export Sales Price per Unit (\$)			1	I		
	Percentage of Total 2019 Sales Attributable to Product						

select Not Applicable' If category is not relevant to your operations (with the contained sendeum, indicate unit used here 2016 2017 2018 2019 2019 (YTD July) K U.S. Sale (Thousand) (USD) 1 1 1 1 1 Average U.S. Sale (Thousand) (USD) 1 1 1 1 1 1 Average U.S. Sale (Thousand) (USD) 1 </th <th></th> <th>Ferrov</th> <th>anadium - 80%+ Vanad</th> <th>lium</th> <th></th> <th></th> <th></th>		Ferrov	anadium - 80%+ Vanad	lium			
continued variability, include variability, is solved field. visibility of solved field. <thvisity field.<="" of="" solved="" th=""> visibility of s</thvisity>	Select 'Not Applicable' if category is not relevant to your operations						
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K. U.S. Sales (kg) Image: matrix of the state of the	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
Average U.S. Sales Price per Unit (5) Image: Contract of Contr						· · · ·	
Expont Sales (Kg) Expont Sales Price per Unit (S) Image: Control of Control Contrel Control Control Control Control Control Control Co	U.S. Sales (Thousands USD)						
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Variation Image Image Image	Export Sales (Kg)						
Percentage of Total 2019 Sales Attributable to Product Vanadium Master Alloys Select 'Not Applicable' if Category is not relevant to your operations Record data in Kg contained vanadium, include unit used here 2016 2017 2018 2019 2019 (YTD July) 2020 (YTD July) U.S. Sales (Rg) U.S. Sales (Rg) 0 0 0 0 0 Average U.S. Sales Price per Unit (S) 0 0 0 0 0 Percentage of Total 2019 Sales Attributable to Product 0 0 0 0 Average Export Sales Price per Unit (S) 0 0 0 0 Record data in Kg contained vanadium, indicate unit used here 0 0 0 0 Percentage of Total 2019 Sales Attributable to Product 0 0 0 0 Percentage of Total 2019 Sales Attributable to Product 0 0 0 0 Percentage of Total 2019 Sales Attributable to Product 0 0 0 0 Vanadium, Mindcate unit used here 0 0 0 0 0 Vanadium, Mindcate unit used here 0 0 0 0 0 Vanadium, Mindcate unit used here 0 0 0 0 0 Vustable (Fig) 0 0 0 <	Export Sales (Thousands USD)						
Vanadium Master Alloys Select Not Applicable' If category is not relevant to your operations Record data in Kg contained vanadium, indicate unit used here U.S. Sales (Kg) 2016 2017 2018 2019 2019 (YTD July) 2020 (YTD July) U.S. Sales (Kg) Image: Contained vanadium, indicate unit used here U.S. Sales (Kg) Image: Contained vanadium, indicate unit used here Image: Contained vanadium, indicate unit	Average Export Sales Price per Unit (\$)						
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contained vanadium, indicate unit used here U.S. and Export Sales 2016 2017 2018 2019 2019 (YTD July) 2020 (YTD July) U.S. Sales (Kg) Image: Contrained vanadium, indicate unit used here	Select 'Not Applicable' if category is not relevant to your operations						
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Percentage of Total 2019 Sales Attributable to Product Vanadium, Wrought and Unwrought (Excluding Master Alloys) Select 'Not Applicable' if category is not relevant to your operations Select 'Not Applicable' if category is not relevant to your operations Record data in Kg contained vanadium. If unable to record data in Kg contained vanadium, indicate unit used here 2016 2017 2018 2019 2019 (YTD July) 2020 (YTD July) U.S. sales (Kg) U.S. sales (Kg) Image LS. Sales Price per Unit (S) Image LS. S							
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contained vanadium, indicate unit used here Comments: U.S. and Export Sales 2016 2017 2018 2019 2019 (YTD July) 2020 (YTD July) M. U.S. Sales (Kg) Image: Comments: I	Select 'Not Applicable' if category is not relevant to your operations						
M. U.S. Sales (Kg) Image: Sales (Kg) Image: Sales (Kg) V.S. Sales (Thousands USD) Image: Sales (Kg) Image: Sales (Kg) Export Sales (Kg) Image: Sales (Kg) Image: Sales (Kg) Export Sales (Thousands USD) Image: Sales (Kg) Image: Sales (Kg) Average Export Sales (Thousands USD) Image: Sales (Kg) Image: Sales (Kg) Percentage of Total 2019 Sales Attributable to Product Image: Sales (Kg) Image: Sales (Kg) Comments: Image: Sales (Kg) Image: Sales (Kg) Image: Sales (Kg)							
U.S. Sales (Thousands USD)Image: Sales Price per Unit (\$)Image: Sales Price per Unit (\$) <td>U.S. and Export Sales</td> <td>2016</td> <td>2017</td> <td>2018</td> <td>2019</td> <td>2019 (YTD July)</td> <td>2020 (YTD July)</td>	U.S. and Export Sales	2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
Average U.S. Sales Price per Unit (\$) Image: Comments: Image: Com	-						
Export Sales (Kg) Image: Second Support Sales (Thousands USD) Image: Second Support Sales Price per Unit (\$) Image: Second Support Sales Price per Unit (\$) Image: Second Support Sales Attributable to Product Image: Second Support Sales Price Pr							
Export Sales (Thousands USD) Image: Average Export Sales Price per Unit (\$) Image: Bit is a constrained of the second of th							
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Percentage of Total 2019 Sales Attributable to Product Comments:							
Comments:	Average Export Sales Price per Unit (\$)						
	Percentage of Total 2019 Sales Attributable to Product						
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act	Comments:						
	BUSI	NESS CONFIDENTIAL - Per	Section 705(d) of the	Defense Production Act	t		

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			3c. Productio	n Feedstock, End Uses, Substitu	tes, and	Supply Disruptions				
An	swer the following questions related to your organizat	tion's manufacturing inputs and m	narket end uses.							
	, , ,									
	Estimate your organization's vanadium product end	uses and associated end use attrik	outes. If your organization solely distributes	vanadium products and does no	ot have ii	nsight into vanadium product en	id-uses, indicate so in the "Unk	nown" box in Row 9.		
	Vanadium End Use	Percent of 2019 Production Attributable to End Use	Average Percent Cost of Vanadium Attributable to End Product Total Cost	Average Percent Vanadium C Attributable to End Produ		Primary Vanadium Product/Grade Needed for End Use	Substitutes Available for Vanadium Usage?	Indicate Primary Substitute, if relevant	Comments	
	1 Steel - High Strength Low Alloy		Vanadium Ores and Concentrates							
	2 Steel - Full Alloy		Vanadates Vanadium Carbides			7	Л			
Α.	3 Steel - Carbon		Vanadium Sulfates					Yes, Substitute Preferred	7	
	4 Steel - Other		Vanadium Hydrides, Sulfides, Nitrides, S					Yes, Vanadium Preferred		
	5 Vanadium-Redox Flow Battery		Vanadium Pentoxide - Up to 99% Vanad					No Substitute		
			High Purity Vanadium Pentoxide - 99%+ Other Vanadium Oxides and Hydroxides							
	6 Aerospace (Master Alloys)		Vanadium-Bearing Feedstocks (Ash, Res							
	7 Chemical		Ferrovanadium - 40-60% Vanadium							
	8 Other - specify		Ferrovanadium - 80%+ Vanadium							
	9 Unknown		Vanadium Master Alloys Vanadium, Wrought and Unwrought (Ex	cluding Master Alloys)						
	Total of 1-9 (must equal 100%):	0%	Other Vanadium-Related	icidanig Master Anoysy						
	licate whether your organization uses vanadium or val oduce and/or sell other vanadium products. (including	-		lf you i	ndicated	Yes, answer the following quest	tions:			
	Subject Product	Primary Feedstock Used to Produce Subject Product	Primary Original Country Source of Feedstock	Primary Reason for Sourcing	Choice	Primary Alternate Feedstock, if Possible	Domestic Feedstock Sources Available?	Supply Disruption or Shortage Experienced?	Explain	
	1 Vanadates									
	2 Vanadium Carbides	Vanadium Or Vanadium Sla	re and Concentrate				\uparrow			
	3 Vanadium Sulfates	A Ash	^{ag}							
	4 Vanadium Hydrides, Sulfides, Nitrides, Silicides, and Borides	Residues		F					Ongoing	7
	5 Vanadium Pentoxide - Up to 99% purity	Spent Cataly		· · · · · · · · · · · · · · · · · · ·					Past	
	 6 High Purity Vanadium Pentoxide - 99%+ purity 		entoxide - Up to 99% purity /anadium Pentoxide - 99%+ purity			nancial Consideration chnical Specification			Future Expected None	
		Vanadates				lationship				
В.	7 Other Vanadium Oxides and Hydroxides	Vanadium Ca				livery				
D.	' (Excluding Pentoxide)8 Ferrovanadium - Under 80% Vanadium	Vanadium Su Vanadium Hy	ydrides, Nitrides, Silicides, and Borides		0	her	Significant Domestic Sources	5		
	9 Ferrovanadium - 80%+ Vanadium	Other					Limited Domestic Sources			
	10 Vanadium Master Alloys	Not Applicab	le				No Domestic Sources			
	Vanadium, Wrought and Unwrought (Excluding									
	¹¹ Master Alloys)									
	Since 2016, have feedstock sourcing issues									
	impacted your organization's ability to fulfill		Explain:							
	contracts for vanadium products?									
	Comments:									
H		l	BUSINESS CONI	FIDENTIAL - Per Section 705(d) c	of the De	fense Production Act				
L										

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			ry and Toll Production					
Ans	swer the following questions regarding your orgar	nization's secondary production/recycling or toll produ	iction operations. Reco	rd \$ in Thousands USD), e.g. \$12,000.00 =	survey input of \$12		
			ees and Other Process					
		ecycling or processing any vanadium-bearing material	s, complete this question	on for the years 2016-2	2020 (YTD July).			
	Select 'Not Applicable' if your organization does and continue to question 2.	not recycle/process vanadium-bearing materials,						
	Average Tipping/Recycling Fee Charged per Kg		2016	2017	2018 Vanadium	2019 Ores and Concentrates	2019 (YTD July)	2020 (YTD July)
	Total Tipping/Recycling Fees Accrued (Thousands Net Tipping/Recycling Fees Accrued (Less Metals				Vanadates			
	Total Facility Operating Costs (Thousands USD)				Vanadium Vanadium			
1	Percent of Total Revenues Attributable to Tipping Percent of Total Revenues Attributable to Vanad	-				Hydrides, Sulfides, Nitrides Pentoxide - Up to 99% Van		
	Average Vanadium Price Needed for Metals	(specify vanadium type) 🧹			High Purity	Vanadium Pentoxide - 999 adium Oxides and Hydroxic	%+ Vanadium	
	Credit to go to Refinery Average Percent of Sales Price Lost to Metals	(specify vanadium type)			Vanadium	Bearing Feedstocks (Ash, F	· •	-
	Credit/Refinery					dium - 40-60% Vanadium dium - 80%+ Vanadium		
	Do vanadium prices impact your organization's d	lecision to perform recycling/processing operations?	Yes No	Explain:		Master Alloys Wrought and Unwrought	(Excluding Master Allov	5)
	Does your organization's profitability depend on	vanadium prices being above a certain level?		Explain:		adium-Related	(
	Con	nments:						
			Toll Production - 1	oller				
	Answer the following questions related to your o	organization's toll production operations, including the			rials supplied, and t	he subsequent total end pr	oduct quantity produce	d with the supplied
		descending order by volume) for 2019, the average pe	-					
	Select 'Not Applicable' if your organization does question 3.	not operate as a toll producer, and continue to						
	-	to record data in Kg contained vanadium, indicate						
	unit used here		2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
	Total Tolling Fees Accrued (Thousands USD) Raw Material Supplied	(Specify Type)						
	Quantity Produced from Above Input	(Specify Type)						
	Raw Material Supplied Quantity Produced from Above Input	(Specify Type) (Specify Type)	$\overline{}$					
2	Customer Name	Percent Revenue Attributable to Customer	Total Quantity F	Produced - 2019	Primary Cour	try of Feedstock Origin	Com	ments
				<u></u>				
					_			
						/anadium Ores and Concen /anadates	trates	-
						/anadium Carbides /anadium Sulfates		-
						/anadium Hydrides, Sulfide /anadium Pentoxide - Up to		l Borides
					ļŀ	ligh Purity Vanadium Pento	oxide - 99%+ Vanadium	
						Other Vanadium Oxides and anadium-Bearing Feedstoo	cks (Ash, Residues, Spen	· · · · ·
	Com	nments:				errovanadium - 40-60% Va errovanadium - 80%+ Vana		
		innents.				/anadium Master Alloys /anadium, Wrought and Ur	wrought (Excluding Ma	ster Alloys)
			Toll Production - T	ollee		Other Vanadium-Related		
		organization's U.S. tollee operations including the tota e top three toll organization's used to convert materia					d product quantity retur	ned and available for
		not operate as a tollee firm, and continue to the next						
	section.	to record data in Kg contained vanadium, indicate						
	unit used here	to record data in kg contained valiadidin, indicate						
			2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July)
	Total Conversion/Tolling Fees Paid (Thousands U							
3	Total Raw Material Supplied to Toller Total Material Available for Sale (Returned by	(Specify Type)	/					
	Toller)	(Specify Type)						
	Total Raw Material Supplied to Toller	(Specify Type)						
	Total Material Available for Sale (Returned by Toller)	(Specify Type)						
	Toller Name	Percent Tolled Attributable to Toller						
	Con	nments:						
	Comn	nents:						
		BUSINESS CONFIDENT	IAL - Per Section 705(d) of the Defense Produ	iction Act			

<u>Pre</u>	vious Page							4. Suppliers/Imports					
For	each product category involving	g purchases by your org	anization from 2016-20	020 (YTD July), including	both U.S., non-U.S., and impo	rt purchases, record all he	eader criteria describing said procurements. If y		nversion services/	'toll produces vanadi	um material, do	o not include mater	rial supplie
								anadium Ores and Concentra		•			
	Identify your total number of s	uppliers for this product	t category. If none, inpu	ut 0.									
	Record data in Kg contained va	nadium. If unable to pr	ovide in Kg contained w	anadium indicate unit i	used here:								
										2016	2	2017	
	Record your total purchases fo	r this product category I	by volume and value for	or each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Volun
	Supplier Name (in			Common Ownership			Percentage of	Purchases that are Imported		2016	2	2017	
A.	descending order by period volume)	Country of Fabrication	Country of Feedstock Origin	With Your Organization?	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volun
	1			7									
	2 3		Yes No		7			K					
	4 5			Customs/F			Steel - High Strength Low Alloy	Financial Consideration	 				
	6 7			Labor Disease/Q Labor Disr		Single Source Sole Source	Steel - Carbon Steel - Other	Technical Specification Relationship					
	8 9			Supplier E	nded Production	Neither	Vanadium-Redox Flow Battery Aerospace (Master Alloys)	Delivery Other					
	10			Supplier W	Vent Out of Business		Other	Vanadates					
	Identify your total number of s	uppliers for this product	t category. If none, inpu	Transporta				Valiauates					
	Record data in Kg contained va	inadium. Il unable to pro	ovide in kg contained va	anadium, indicate unit i						204.6			
	Record your total purchases fo	r this product category I	by volume and value for	or each applicable year.						2016		2017	Volum
			,						Volume	Value (\$000)	Volume	Value (\$000)	Volun
							Percentage of	Purchases that are Imported	ļ	2016	2	2017	
в.	Supplier Name (in descending order by period	Country of Fabrication	Country of Feedstock Origin	With Your	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volun
	volume)		0.18.11	Organization?					Volume		Volume		Volui
	2											<u> </u>	
	3 4												
	5 6												
	7 8												
	9 10												
								Vanadium Carbides	1		l		
	Identify your total number of s	uppliers for this product	t category. If none, inpu	ut 0.									
	Record data in Kg contained va	inadium. If unable to pro	ovide in Kg contained va	anadium, indicate unit u	used here:					204.6			
	Record your total purchases fo	r this product category I	by volume and value for	r each applicable year.					Volume	2016 Value (\$000)	Volume	2017 Value (\$000)	Volun
							Percentage of	Purchases that are Imported		2016	2	2017	
C.	Supplier Name (in descending order by period	Country of Fabricatior	Country of Feedstock Origin	With Your	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volun
	volume)			Organization?									
	2												
	3 4											<u> </u>	<u> </u>
	5 6											<u> </u>	
	7 8												
	9 10												
								Vanadium Sulfates	•		•		
	Identify your total number of s	uppliers for this product	t category. If none, inpu	ut 0.									
	Record data in Kg contained va	inadium. If unable to pro	ovide in Kg contained va	anadium, indicate unit u	used here:								
										2016		2017	
	Record your total purchases fo	r this product category I	by volume and value for	or each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Volun
							Percentage of	Purchases that are Imported					
D.	Supplier Name (in descending order by period		Country of Feedstock	Common Ownership With Your	Primary Source of Disruption	Single/Sele Source?	Drimony End Liso	Top Factor Influencing	2	2016	2	2017	
	volume)		n Origin	Organization?	Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volum
	1 2												
	3											<u> </u>	<u> </u>
	5											<u> </u>	
	7 8											<u> </u>	
	9 10											<u>+</u>	
	10	1	1	I	1	I	I	1	I	I	I	I	I

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			4. Suppliers/Imports												
on-U.S., and import	t purchases, record all hea	ader criteria describing said procurements. If y	our organization operates con	version services/to	Il produces vanadiu	um material, do	not include materi	ial supplied by cu	ustomers for conve	rsion here. Rec	ord \$ in Thousand	ls USD, e.g. \$12,0	000.00 = survey ir	put of \$12	
		V	anadium Ores and Concentra	tes											
				20	16	2	017	2	018	20)19	2019 (Y	TD July)	2020 (\	/TD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported												
ource of Discuption			Top Easter Influencing	20	16	2	017	2	018	20)19	2019 (Y	TD July)	2020 (١	(TD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
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			N,												
	K	Steel - High Strength Low Alloy													
	Single Source	Steel - Full Alloy Steel - Carbon	Financial Consideration Technical Specification												
	Sole Source Neither	Steel - Other Vanadium-Redox Flow Battery	Relationship												
tion elays		Aerospace (Master Alloys)	Delivery Other												
Business		Other	Manadataa	-											
			Vanadates												
				20	16	2	017	20	018	20	019	2019 (Y	TD July)	2020 (Y	/TD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported	20	16	2	017	2	018	2()19	2019 (Y	TD July)	2020 (\	(TD July)
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing									(.			
ced, If Applicable	Single/Sole Source:	Plinaly Enu-Ose	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
			Vanadium Carbides												
				20	16	2	017	20	018	20)19	2019 (Y	TD July)	2020 (\	/TD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported		4.5		047		24.0	24	24.0	2010/0		2020 ()	
ource of Disruption			Top Factor Influencing	20	16	2	017	2	018	20	019	2019 (Y	TD July)	2020 (Y	(TD July)
ced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
			Vanadium Sulfates												
				20			017		018		019	2019 (Y			/TD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported				047		010						
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing	20	16	2	017	20	018	20	019	2019 (Y	TD July)	2020 (Y	(TD July)
ced, If Applicable	Single/Sole Source?	Fillindi y Lilu-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
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			4. Suppliers/Imports												<u>Next Page</u>
on-U.S., and import	purchases, record all hea	ader criteria describing said procurements. If ye	our organization operates con	version services/t	toll produces vanadi	um material, do	not include materi	al supplied by cu	ustomers for conve	rsion here. Rec	ord \$ in Thousand	ls USD, e.g. \$12,(100.00 = survey in	put of \$12	
		V	anadium Ores and Concentra	tes											
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		Percentage of	Purchases that are Imported	2	016	2	017	20	018	20)19	2019 (Y	'TD July)	2020 (YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing												
			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
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	Single Source Sole Source	Steel - Carbon	Financial Consideration Technical Specification												
tion	Neither	Steel - Other Vanadium-Redox Flow Battery	Relationship Delivery											ļ	
lays		Aerospace (Master Alloys) Other	Other												
usiness		other	Vanadates												
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				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported	2	016	2	017	2(018	2()19	2019 (Y	/TD July)	2020 (YTD July)
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing												
ced, If Applicable	0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
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ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
					,								. ,		
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			Dunakasasat												
		Percentage of	Purchases that are Imported	2	016	2	017	20	018	20)19	2019 (Y	′TD July)	2020 (YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier												
			i arenase nom supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
			+											[]	

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			4. Suppliers/Imports												
on-U.S., and import	t purchases, record all he	ader criteria describing said procurements. If y	our organization operates con	version services/to	oll produces vanadiu	um material, do	not include materi	al supplied by c	customers for conve	ersion here. Rec	ord \$ in Thousand	ls USD, e.g. \$12,0	000.00 = survey in	put of \$12	
		V	anadium Ores and Concentra	tes											
				20	016	20	017	2	2018	20)19	2019 (Y	'TD July)	2020 (YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
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ource of Disruption			Top Factor Influencing	20	016	20	017	2	2018	20)19	2019 (Y	'TD July)	2020 (YTD July)
ced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
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		Steel - High Strength Low Alloy Steel - Full Alloy	Financial Consideration	1											
	Single Source Sole Source	Steel - Carbon	Technical Specification												
tion	Neither	Steel - Other Vanadium-Redox Flow Battery	Relationship Delivery												
lays		Aerospace (Master Alloys) Other	Other												
Business		otici	Vanadates												
				20	016	21	017	2	2018	20)19	2019 (V	'TD July)	2020 (YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported		1		I		I		<u> </u>		I		
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ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
, ····pp······			·	Foldine	Falae (\$500)			Volume				Volume		Volume	
			Vanadium Carbides												
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		Percentage of	Purchases that are Imported	Volume	Value (\$000)	Volume		Volume		Volume		Volume	Value (\$000)	Volume	
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ource of Disruption ced, If Applicable	Single/Sole Source?	Percentage of Primary End-Use	Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?			Volume	Value (\$000)	Volume		Volume		Volume		Volume	Value (\$000)	Volume	
	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
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	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
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	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
	Single/Sole Source?		Top Factor Influencing Purchase from Supplier	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
	Single/Sole Source?		Top Factor Influencing Purchase from Supplier	Volume 20	Value (\$000)	Volume 20	017	Volume 2	2018	Volume 20)19	Volume 2019 (Y	Value (\$000) TD July)	Volume 2020 (YTD July)
	Single/Sole Source?		Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume	2018 Value (\$000)	Volume 20 Volume	019 Value (\$000)	Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000)	Volume 2020 (Volume	YTD July) Value (\$000)
	Single/Sole Source?		Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume	2018 Value (\$000)	Volume 2(Volume	019 Value (\$000)	Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000) Value (\$000)	Volume 2020 (Volume	YTD July) Value (\$000)
	Single/Sole Source?		Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume	2018 Value (\$000)	Volume 20 Volume	019 Value (\$000)	Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000)	Volume 2020 (Volume	YTD July) Value (\$000)
	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume	2018 Value (\$000)	Volume 2(Volume	019 Value (\$000)	Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000) Value (\$000)	Volume 2020 (Volume	YTD July) Value (\$000)
	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume 20 Volume 20 Volume	Value (\$000)	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume 2 Volume 2 Volume	2018 Value (\$000)	Volume 20 Volume	019 Value (\$000)	Volume 2019 (Y Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000) Value (\$000) Image: State of the stat	Volume 2020 (Volume 2020 (Volume 2020 (Volume	YTD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier Purchase from Supplier Vanadium Sulfates Vanadium Sulfates	Volume 20 Volume 20 Volume 20 Volume	Value (\$000) D16 Value (\$000) D16 Value (\$000) D16 Value (\$000) D16	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume 2 Volume 2 Volume	2018 Value (\$000)	Volume 20 Volume 20 Volume 20 Volume	019 Value (\$000)	Volume 2019 (Y Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000) Value (\$000) Data Data Data Data Data Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) TD July) Value (\$000)	Volume 2020 (Volume 2020 (Volume 2020 (Volume	YTD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier Image: Supplier	Volume 20 Volume 20 Volume 20 Volume	Value (\$000)	Volume 20 Volume	017 Value (\$000)	Volume 2 Volume 2 Volume 2 Volume	2018 Value (\$000)	Volume 20 Volume	019 Value (\$000)	Volume 2019 (Y Volume 2019 (Y Volume	Value (\$000) TD July) Value (\$000) Value (\$000) Image: State of the stat	Volume 2020 (Volume 2020 (Volume 2020 (Volume	YTD July) Value (\$000)
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ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier Purchase from Supplier Vanadium Sulfates Vanadium Sulfates	Volume 20 Volum	Value (\$000) D16 Value (\$000) D16 Value (\$000) D16 Value (\$000) D16	Volume 20 Volume 20 Volume 20 Volume	017 Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	2018 Value (\$000)	Volume 20 Volume 20 Volume 20 Volume	019 Value (\$000)	Volume 2019 (Y Volume 2019 (Y Volume 2019 (Y	Value (\$000) TD July) Value (\$000) Value (\$000) Data Data Data Data Data Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) TD July) Value (\$000)	Volume 2020 (Volume 2020 (Volume 2020 (Volume	YTD July) Value (\$000)
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								Vanadium Hyd	rides, Nitrides, Azides, Silici	des, and Borides				
	Identify	y your total number of su	ppliers for this product	category. If none, input	ıt 0.									
	Record	l data in Kg contained van	adium. If unable to pro	ovide in Kg contained va	anadium, indicate unit us	sed here:								
			· .							20	16	20	017	
	Record	l your total purchases for	this product category b	by volume and value for	r each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Volum
								Deveente en of						
	Suppli	ier Name (in			Common Ownership			Percentage of	Purchases that are Imported	20	16	20	017	
E.		ending order by period	Country of Fabrication	Country of Feedstock Origin	With Your	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volum
	1	volume)			Organization?						() ,			
	2													
	3													
	5													
	6 7													
	8 9													
	10													
								Vana	dium Pentoxide - Up to 99%	purity				
	Identity	y your total number of su	ppliers for this product	category. It none, inpu	it U.									
	Record	data in Kg contained van	adium. If unable to pro	ovide in Kg contained va	anadium, indicate unit us	sed here:								
										20			017	
	Record	l your total purchases for	this product category b	by volume and value for	r each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Volum
								Percentage of	Purchases that are Imported	20	16	20	017	
		ier Name (in		Country of Feedstock	Common Ownership	Primary Source of Disruption	<u> </u>		Top Factor Influencing	20	10	2	017	
F.	desc	ending order by period volume)	Country of Fabrication	Origin	With Your Organization?	Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volum
	1													
	2 3													
	4													
	5													
	7 8													
	9													
	10							High Pur	 ity Vanadium Pentoxide - 99	9%+ purity				
	Identify	y your total number of su	ppliers for this product	category. If none, inpu	ıt 0.									
	Record	l data in Kg contained van	adium. If unable to pro	ovide in Kg contained va	anadium, indicate unit us	sed here:								
										20	16	20	017	
	Record	l your total purchases for	this product category b	by volume and value for	r each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Volum
								Percentage of	Purchases that are Imported					
		ier Name (in		Country of Feedstock	Common Ownership	Primary Source of Disruption			Top Factor Influencing	20	16	20	017	
G.	desc	ending order by period volume)	Country of Fabrication	Origin	With Your Organization?	Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volum
	1													
	2 3													
	4													
	5 6													
	7 8													
	9													
	10							Other Vanadium	Oxides and Hydroxides (Exc	luding Pentoxide)				<u> </u>
	Identify	y your total number of su	ppliers for this product	category. If none, input	ıt 0.									
	Record	l data in Kg contained van	adium. If unable to pro	ovide in Kg contained va	anadium, indicate unit us	sed here:								
										20	16	20	017	
	Record	your total purchases for	this product category b	by volume and value for	r each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Volum
								Percentage of	Purchases that are Imported					
	Suppli	ier Name (in			Common Ownership					20	16	20	017	
Н.	desc		Country of Fabrication	Country of Feedstock Origin	With Your Organization?	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volum
	1													
	2 3													
	4													
	5 6													
	7													
	8 9													
	10													

		Vanadium Hyd	rides, Nitrides, Azides, Silicid	es, and Borides											
				2(016	2	017	2	018	2	019	2019 (\	′TD July)	2020 (\	YTD July)
			-	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Deventeerer													
		Percentage of	Purchases that are Imported		016	2	.017	2	018	2	019	2019 (\	/TD July)	2020 (`	YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Vana	dium Pentoxide - Up to 99%	purity	1						1				I
			-		016		.017		018		019		'TD July)		YTD July)
			F	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported				017		010						
ource of Disruption			Top Factor Influencing	2(016	2	.017	2	018	2	019	2019 (\	'TD July)	2020 (\	YTD July)
ced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		High Pur	ity Vanadium Pentoxide - 999	%+ purity					· · · · · · · · · · · · · · · · · · ·				1		L
			_	20	016	2	.017	2	018	2	019	2019 (\	'TD July)	2020 (\	YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported												
				20	016	2	.017	2	018	2	019	2019 (\	'TD July)	2020 (\	YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
			r drendse nom supplier	volume	value (\$000)	volume	Value (\$000)	volume	value (\$000)	volume	value (\$000)	volume	value (\$000)	volume	value (\$000)
		Other Vanadium	Oxides and Hydroxides (Excl	uding Pentoxide)											
				<u> </u>											
				20	016	2	.017	2	018	2	019	2019 (\	'TD July)	2020 (\	YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of	Purchases that are Imported												
ource of Disruption			Top Factor Influencing		016	2	017	2	018	2	019	2019 (\	'TD July)	2020 (`	YTD July)
iced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
							++								
l		I	ı İ		1 I		1 I		i l		I	l	I		ı I

		Vanadium Hy	ydrides, Nitrides, Azides, Silicio	les, and Borides											
				20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	20 Volume	019 Value (\$000)	2019 (Y Volume	'TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000)
				Volume	Value (\$000)	volume	Value (5000)	Volume	Value (5000)	Volume	Value (5000)	volume	Value (3000)	volume	value (\$000)
		Percentage c	of Purchases that are Imported				017	2	010		210	2010 ()		2020 ()	
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing		016	2	017		018		019		'TD July)		YTD July)
ced, If Applicable	Single/Sole Source:	Thinkiy Lite-03e	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Var	nadium Pentoxide - Up to 99%	purity											
				20	016	2	017	2	018	2	019	2019 (\	(TD July)	2020 (\	YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage o	of Purchases that are Imported												
		reitentaget			016	2	017	2	018	2	019	2019 (\	/TD July)	2020 (\	YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
·							,		(,		(1)		()		(1 ,
		High P	urity Vanadium Pentoxide - 99	%+ purity											
						2	047		04.0	2	24.0	2010 ()		2020 ()	
					016		017		018		019		(TD July)		YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage c	of Purchases that are Imported												
					016	2	017	2	018	2	019	2019 (\	'TD July)	2020 (`	YTD July)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
, pp				Volume	Value (9000)	Volume	Value (2000)	volume	Value (2000)	Volume	Value (2000)	volume	Value (2000)	volume	Value (2000)
		Other Vanadiu	IM Oxides and Hydroxides (Exc	uding Pentoxide)											
									010						
				20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	'TD July) Value (\$000)	2020 (` Volume	YTD July) Value (\$000)
														volume	
		Percentage c	of Purchases that are Imported		016	20	017	2	018	2)19	2019 (/TD July)	2020 (YTD July)
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing												
ced, If Applicable			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
1			т I		I Contraction of the second se				. 1	I.	. I				. I

		Vanadium Hydri	ides, Nitrides, Azides, Silicio	les and Borides											
		Vanaulum Hyun	ides, Mitrides, Azides, Sinci												
				20	016	2	.017		2018	2	019	2019 (\	YTD July)	2020 (\	(TD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of P	Purchases that are Imported)16	2	.017		2018	2	019	2019 (\	YTD July)	2020 (\	(TD July)
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing												
nced, If Applicable			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
I		Vanad	dium Pentoxide - Up to 99%	purity					<u> </u>		<u> </u>				
			· · · · · · · · · · · · · · · · · · ·												
				20)16	2	.017		2018	2	019	2019 (\	YTD July)	2020 (\	(TD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Percentage of P	Purchases that are Imported							2		2010 /		2020 //	
ource of Disruption			Top Factor Influencing	20	016	2	017		2018	2	019	2019 (\	YTD July)	2020 (\	(TD July)
nced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		High Purit	ty Vanadium Pentoxide - 99	%+ purity											
				20)16	2	017		2018	2	019	2019 (\	YTD July)	2020 (\	(TD July)
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (\ Volume	YTD July) Value (\$000)	2020 (Y Volume	(TD July) Value (\$000)
		Percentage of P	Purchases that are Imported	Volume											
		Percentage of P	Purchases that are Imported	Volume		Volume		Volume		Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
ource of Disruption	Single/Sole Source?		Top Factor Influencing	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume		Volume		Volume	
ource of Disruption	Single/Sole Source?	Percentage of P Primary End-Use		Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
ource of Disruption aced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption aced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption aced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption aced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption ced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption ced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption ced, If Applicable	Single/Sole Source?		Top Factor Influencing	Volume 20	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption aced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption iced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing	Volume 20 Volume	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
Durce of Disruption leed, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
Durce of Disruption leed, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 2	Value (\$000) 017	Volume	Value (\$000)	Volume 2	Value (\$000) 019	Volume 2019 (\	Value (\$000) //////////////////////////////////	Volume 2020 (\	Value (\$000) /TD July)
ource of Disruption aced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 2 Volume	Value (\$000) O17 Value (\$000) Value (\$000)	Volume	Value (\$000)	Volume 2 Volume	Value (\$000) 019 Value (\$000) Value (\$000) 1	Volume 2019 (\ Volume	Value (\$000)	Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000)
Durce of Disruption loced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide)	Value (\$000)	Volume 2 Volume	Value (\$000) O17 Value (\$000) O17 O17 O17 O17 O17 O17 O17 O1	Volume Volume	Value (\$000)	Volume 2 Volume	Value (\$000)	Volume 2019 (\ Volume	Value (\$000)	Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000)
Durce of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume	Value (\$000)	Volume 2 Volume	Value (\$000) O17 Value (\$000) Value (\$000)	Volume	Value (\$000)	Volume 2 Volume	Value (\$000) 019 Value (\$000) Value (\$000) 1	Volume 2019 (\ Volume	Value (\$000)	Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000)
Durce of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume luding Pentoxide) 20 Volume	Value (\$000)	Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume Volume	Value (\$000)	Volume 2 Volume 4 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000)
iced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume luding Pentoxide) 20 Volume	Value (\$000)	Volume 2 Volume	Value (\$000) O17 Value (\$000) O17 O17 O17 O17 O17 O17 O17	Volume Volume	Value (\$000)	Volume 2 Volume 4 Volume 2 Volume	Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000)
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume luding Pentoxide) 20 Volume	Value (\$000)	Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 4 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
ced, If Applicable		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
iced, If Applicable		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)
ource of Disruption		Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume 20 Volume Iuding Pentoxide) 20 Volume 20	Value (\$000)	Volume 2 Volume 2 Volume 2 Volume 2 Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) O17 Value (\$000) O17 Value (\$000)	Volume Volume Volume Volume Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Image: Stress of the stress of the	Volume 2 Volume 2 Volume 2 Volume 2 Volume 2	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2019 (\ Volume 2019 (\ Volume 2019 (\ Volume	Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000) Value (\$000)	Volume 2020 (\ Volume 2020 (\ Volume 2020 (\ Volume	Value (\$000) (TD July) Value (\$000) (TD July) (TD July) Value (\$000) (TD July) Value (\$000)

	1					Vanadium-Bearing Fe	eedstocks (Ash, Residues, Spe	nt Catalysts, Slag,	Etc.)				
	Identify your total number of su	uppliers for this product	category. If none, inpu	ıt 0.									
	Record data in Kg contained va	nadium. If unable to pro	ovide in Kg contained va	anadium. indicate unit u	ised here:								
									20	016	2	017	
	Record your total purchases for	this product category b	by volume and value fo	r each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Vo
							Percentage of	Purchases that are Imported					
	Supplier Name (in			Common Ownership					20	016	2	017	
١.	descending order by period volume)	Country of Fabrication	Country of Feedstock Origin	With Your Organization?	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Vo
	1												
	2												
	3 4												
	5 6												
	7 8												
	9 10												
							Ferr	ovanadium - Under 80% Vana	adium		I	1	
	Identify your total number of su	uppliers for this product	category. If none, inpu	ıt 0.									
	Record data in Kg contained va	nadium. If unable to pro	ovide in Kg contained va	anadium, indicate unit u	used here:								
								-		016		017	
	Record your total purchases for	this product category b	by volume and value fo	r each applicable year.				ſ	Volume	Value (\$000)	Volume	Value (\$000)	Vo
					1	1	Percentage of	Purchases that are Imported					
J.	Supplier Name (in descending order by period	Country of Fabrication	Country of Feedstock	Common Ownership With Your	Primary Source of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing		016		017	
	volume)		Origin	Organization?	Experienced, If Applicable			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Vo
	1 2												
	3 4												
	5 6												
	7 8												
	9 10												
		·		·	• 		F	errovanadium - 80%+ Vanadiu	um	•	-	• 	•
	Identify your total number of su	uppliers for this product	category. If none, inpu	it 0.									
	Record data in Kg contained va	nadium. If unable to pro	ovide in Kg contained va	anadium, indicate unit u	ised here:								
	Record your total purchases for	this product category b	by volume and value fo	r each applicable year.				-	20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	Vo
							Percentage of	Purchases that are Imported					
	Supplier Name (in descending order by period		Country of Feedstock	Common Ownership	Primary Source of Disruption	Single (Cele Seurce)		Top Factor Influencing	20	016	2	017	
К.	volume)		Origin	With Your Organization?	Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Vo
	1 2												
	3												
	5												
	7 8												
	9 10												
		1	I					Vanadium Master Alloys			I	I	
	Identify your total number of su	uppliers for this product	category. If none, inpu	ıt 0.									
	Record data in Kg contained va	nadium. If unable to pro	ovide in Kg contained va	anadium, indicate unit u	ised here:								
	Record your total purchases for	this product category b	y volume and value fe	reach applicable year				-	20 Volume)16 Value (\$000)	2 Volume	017 Value (\$000)	
		tins product category b		. cuch applicable yedf.				Durchases that are line	volume	Value (\$000)	volume	Value (\$000)	Vo
	Supplier Name (in			Common Ownership			Percentage of	Purchases that are Imported	20	016	2	017	
L.	descending order by period	Country of Fabrication	Country of Feedstock Origin	With Your Organization?	Primary Source of Disruption Experienced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Vo
	1			οιδαιπεατιοπι									
	2												
	4												
	5 6 7												
	8												
	9 10												
	Identify your total number of su	appliers for this product	category. If none input	ıt 0.			Vanadium, Wro	ught and Unwrought (Excludii	ng waster Alloys)				
Identify your total number of suppliers for this product category. If none, input 0. Record data in Kg contained vanadium. If unable to provide in Kg contained vanadium, indicate unit used here:													
	Record data in Kg contained va	aduum. If unable to pro	ovide in Kg contained va	anadium, indicate unit u	iseu nere:				20	016	2	017	
	Record your total purchases for	this product category b	by volume and value fo	r each applicable year.					Volume	Value (\$000)	Volume	Value (\$000)	Vo
							Percentage of	Purchases that are Imported				1	
	Supplier Name (in descending order by period	Country of Fabrication	Country of Feedstock	Common Ownership With Your	Primary Source of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing		016		017	
M.	volume)		Origin	Organization?	Experienced, If Applicable			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Vo
	1 2												
	3 4												
	5												
	7 8												
	8 9 10												
			1	I	I	I	1			I	<u>I</u>	1	1
	Comments:								N (1)				
1							BUSINESS CONFIDENTI	AL - Per Section 705(d) of the	Detense Product	ion Act			

		Vanadium Boaring Ed	eedstocks (Ash, Residues, Spe	unt Catalysts Slag											
		Vanadium-Bearing Fe	eeastocks (Ash, Residues, Spe	ent Catalysts, Slag	;, Etc.)										
				2 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported												
ource of Disruption			Top Factor Influencing		016	2	017	2	018	2	019	2019 (Y	'TD July)	2020 (YTD July)
nced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Ferr	ovanadium - Under 80% Van	adium											
				2 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported												
ource of Disruption nced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier		016		017	2 Volume	018	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July)		YTD July)
				volume	Value (\$000)	Volume	Value (\$000)	volume	Value (\$000)	volume	Value (\$000)	volume	Value (\$000)	Volume	Value (\$000
		F	errovanadium - 80%+ Vanadi	um											
				2	016	2	017	2	018	2	019	2019 (Y	'TD July)	2020 (YTD July)
		Borcontago of	Purchases that are Imported	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing		016	2	017		018	2	019	2019 (Y			YTD July)
nced, If Applicable	Shight/Sole Source.		Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
			Vanadium Master Alloys												
							047		240			2010 ()		2020 (
				Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	Volume	018 Value (\$000)	Volume	019 Value (\$000)	Volume	'TD July) Value (\$000)	Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported		016	2	017	2	018	2	019	2019 (Y	TD July)	2020 (YTD July)
ource of Disruption nced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Vanadium, Wro	ught and Unwrought (Excludi	ng Master Alloys)										
				2 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$00
		Percentage of	Purchases that are Imported		016		017		018		019	2010 ((TD July)	2020 (YTD July)
ource of Disruption nced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
		BUSINESS CONFIDENTI	IAL - Per Section 705(d) of the	Defense Product	tion Act										
		BOSINESS CONFIDENTI													

		Vanadium-Bearing Fe	eedstocks (Ash, Residues, Spe	nt Catalysts, Slag,	ETC.)										
					016		017		018		019		(TD July)		YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Percentage of	Purchases that are Imported)16	2	017	2	018	2	019	2019 (Y	/TD July)	2020 (YTD July)
ource of Disruption nced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
														; 	
		Ferr	ovanadium - Under 80% Van	adium											
				20	016	2	017	2	018	2	019	2019 (Y	/TD July)	2020 (YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Percentage of	Purchases that are Imported		016	2	017		.018		019	2010 //		2020/	
ource of Disruption nced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	(TD July) Value (\$000)	Volume	YTD July) Value (\$000
		F	errovanadium - 80%+ Vanadi	um											
				20	016	2	017	2	018	2	019	2019 (Y	(TD July)	2020 (YTD July)
		Demonstrate of	Duuchaass that are been to d	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
ource of Disruption			Purchases that are Imported Top Factor Influencing		016	2	017	2	018	2	019	2019 (Y	/TD July)	2020 (`	YTD July)
nced, If Applicable	Single/Sole Source?	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
			Vanadium Master Alloys												
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	(TD July) Value (\$000)	2020 (\ Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported												
ource of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing)16		017		018		019		(TD July)		YTD July)
nced, If Applicable			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Vanadium Wro	ught and Unwrought (Excludi	ng Master Allows											
				AllUys)											
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	(TD July) Value (\$000)	2020 (\ Volume	YTD July) Value (\$00
		Percentage of	Purchases that are Imported)16	2	017	2	018	2	019	2019 (Y	/TD July)	2020 (YTD July)
ource of Disruption nced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
				Deferre D. 1	ion Act										
		BUSINESS CONFIDENTI	AL - Per Section 705(d) of the	Detense Product	ιση Αζ										

		Vanadium-Bearing Fe	eedstocks (Ash, Residues, Spe	nt Catalysts, Slag,	ETC.)										
					016		017		2018		019		(TD July)		YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Percentage of	Purchases that are Imported)16	2	017	2	2018	2	019	2019 (Y	(TD July)	2020 (YTD July)
ource of Disruption aced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Ferr	ovanadium - Under 80% Vana	adium											
				20	216	2	017		0010		010	2010 (V		2020 /	
				Volume	016 Value (\$000)	Volume	017 Value (\$000)	Volume	2018 Value (\$000)	Volume	019 Value (\$000)	Volume	(TD July) Value (\$000)	Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported												
ource of Disruption aced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	(TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$00
			· · · · · · · · · · · · · · · · · · ·	Volume		Volume		volume		volume				volume	
		Fi	errovanadium - 80%+ Vanadi	um											
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	/TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported		016	2	017	2	2018	2	019	2019 (Y	TD July)	2020 (l YTD July)
ource of Disruption iced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
			Vanadium Master Alloys												
							047		2010		010	2010 //		2022 /	
				Volume	016 Value (\$000)	Volume	017 Value (\$000)	Volume	2018 Value (\$000)	Volume	019 Value (\$000)	Volume	/TD July) Value (\$000)	Volume	YTD July) Value (\$000
		Percentage of	Purchases that are Imported		016	2	017	2	2018	2	019	2019 (Y	/TD July)	2020 (YTD July)
ource of Disruption need, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Vanadium, Wro	ught and Unwrought (Excludi	ng Master Alloys)											
				20	016	2	017		2018		019	2019 (Y	(TD July)	2020 (YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
		Percentage of	Purchases that are Imported		016	2	017	2	2018	2	019	2019 (Y	/TD July)	2020 (YTD July)
ource of Disruption need, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
		DUCINECS CONFIDENT	AL - Day Continue 705/-11 - 11	Defence Desident	ion Act										
		BUSINESS CONFIDENTI	AL - Per Section 705(d) of the	verense Producti	ισπ Αζζ										

		Vanadium-Bearing Fe	edstocks (Ash, Residues, Spe	nt Catalysts, Slag,	Etc.)										
			_	20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000)
		Percentage of	Purchases that are Imported												
ource of Disruption	Single/Sole Source?		Top Factor Influencing	20	016	20	017		2018	2	019	2019 (Y	TD July)	2020 (YTD July)
ced, If Applicable	Single/Sole Source:	Primary End-Use	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
		Ferr	ovanadium - Under 80% Vana	dium											
)4 C	2	017		2018		010	2010 ()		2020 /	
			-	Volume	016 Value (\$000)	Volume	017 Value (\$000)	Volume	2018 Value (\$000)	Volume	019 Value (\$000)	2019 (Y Volume	Value (\$000)	2020 (Volume	YTD July) Value (\$000)
		Percentage of	Purchases that are Imported	22								2010 ()		2022 /	
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	016 Value (\$000)	Volume	017 Value (\$000)	Volume	2018 Value (\$000)	Volume	019 Value (\$000)	2019 (Y Volume	Value (\$000)	Volume	YTD July) Value (\$000)
		Fe	l errovanadium - 80%+ Vanadiu	m	I										
				20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000)
		Percentage of	Purchases that are Imported	20		20				2		2010 (\		2020 /	
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	016 Value (\$000)	Volume	017 Value (\$000)	Volume	2018 Value (\$000)	Volume	019 Value (\$000)	2019 (Y Volume	Value (\$000)	Volume	YTD July) Value (\$000)
			Vanadium Master Alloys		<u> </u>										
			-	20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000)
		Percentage of	Purchases that are Imported												
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000)
		Vanadium, Wro	ught and Unwrought (Excludir	g Master Alloys)											
				20 Volume)16 Value (\$000)	20 Volume	017	Volume	2018 Value (\$000)	2 Volume	019	2019 (Y		2020 (Volume	YTD July)
		Percentage of	Purchases that are Imported				Value (\$000)				Value (\$000)	Volume	Value (\$000)		Value (\$000)
ource of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	20 Volume	016 Value (\$000)	20 Volume	017 Value (\$000)	Volume	2018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Volume	YTD July) Value (\$000)
				volume		volume		volume		volume		volume		volume	value (\$000)
		BUSINESS CONFIDENTI	AL - Per Section 705(d) of the	Defense Producti	ion Act										
		BOSINESS CONFIDENTIA													

		Varadium Passing F	adataska (Ash Dasiduas Saa	at Catalysta Slag											
		vanadium-вearing F	eedstocks (Ash, Residues, Spe	nt Catalysts, Slag	, Etc.)										
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Y Volume	YTD July) Value (\$000
		Percentage of	f Purchases that are Imported												
urce of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing		016		017		018		019	2019 (Y			YTD July)
ed, If Applicable			Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		Feri	rovanadium - Under 80% Vana	adium											
				21	016	2	017	2	018	2	019	2019 (Y	TD July)	2020 (YTD July)
				Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
		Percentage of	f Purchases that are Imported		016	2	017	2	018	2	019	2019 (Y	TD July)	2020 (YTD July)
urce of Disruption ced, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000
		F	errovanadium - 80%+ Vanadi	um							<u> </u>				
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Y Volume	YTD July) Value (\$00
		Percentage of	f Purchases that are Imported			2		2		2		2010 (V		2020/	
urce of Disruption ed, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	Volume	016 Value (\$000)	Volume	017 Value (\$000)	Volume	018 Value (\$000)	Volume	019 Value (\$000)	2019 (Y Volume	Value (\$000)	Volume	YTD July) Value (\$00
			Vanadium Master Alloys												
				20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Y Volume	YTD July) Value (\$000
		Percentage of	f Purchases that are Imported												
urce of Disruption ed, If Applicable	Single/Sole Source?	Primary End-Use	Top Factor Influencing Purchase from Supplier	20 Volume	016 Value (\$000)	2 Volume	017 Value (\$000)	2 Volume	018 Value (\$000)	2 Volume	019 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Y Volume	YTD July) Value (\$00
				volume		volume	value (9000)	volume		volume		Volume	Value (\$000)	Volume	
		Vanadium, Wro	ught and Unwrought (Excludi	ng Master Alloys))										
				20	016	2	017	2	018	2	019	2019 (Y	TD July)	2020 ('	YTD July)
		Percentage of	f Purchases that are Imported	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
urce of Disruption	Single/Sole Source?	Primary End-Use	Top Factor Influencing		016	2	017	2	018	2	019	2019 (Y		2020 (\	YTD July)
ed, If Applicable		, finding Enu-Ose	Purchase from Supplier	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$00
		BUSINESS CONFIDENT	IAL - Per Section 705(d) of the	Defense Product	tion Act										

Pre	revious Page or each product category involving shipments by your organization from 2016-2020 (YTD July), including U.S. internal and U.S. export shipment but excluding shipments from non-U.S. locatio accord \$ in Thousands USD, e.g. \$12,000.00 = survey input of \$12													
					2020 (YTD July), including U.S. internal and U.S. expor	rt shipment but excluding shipments fror	n non-U.S. locatio							
							Vana							
				Identify your tota	I number of current customers for this product categ	ory. If none, input 0.								
			R	ecord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	ed vanadium, indicate unit used here:								
А.		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Primary Industry/Sector Represented by Customer (NAICS - 6-Digit Code)	Volume							
	1			1	N									
	3		Yes											
	4		No			Steel - High Strength Low Alloy								
	5					Steel - Full Alloy Steel - Carbon								
	6 7				\\\\\\\	Steel - Other								
	8					Vanadium-Redox Flow Battery								
	9		Aerospace (Master Alloys)											
	10 Other													
	Identify your total number of customers for this product category. If none, input 0.													
	Identify your total number of customers for this product category. If none, input 0. Record data in Kg contained vanadium. If unable to provide data in Kg contained vanadium, indicate unit used here:													
			R	ecord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	ed vanadium, indicate unit used here:								
		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented by Customer (NAICS)	Volume							
в.	1													
	2													
	4													
	5													
	6 7													
	8													
	9													
	10													
	Identify your total number of customers for this product category. If none, input 0. Record data in Kg contained vanadium. If unable to provide data in Kg contained vanadium, indicate unit used here:													
	Customer Name (in Common Ownershin													
		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented by Customer (NAICS)	Volume							
С.	2													
	3													
	4													
	6													
	7													
	8													
	9													
	10				I									
				Identify your	total number of customers for this product category.	If none, input 0.								
			Re	ecord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	ed vanadium, indicate unit used here:								
	desce	omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented by Customer (NAICS)	Volume							
D.	1 2													
	3													
	4													
	5													
	7													
	8													
	9													
	10						1							

												<u>Next Pa</u>
ments from	5. 0 non-U.S. locations, r	Customers/Export record all header c		e shipments. *Find	your location's No	rth American Indust	ry Classification Sys	tem (NAICS) codes	at http://www.cer	isus.gov/epcd/wwv	v/naics.html.	
	Vanadiur	n Ores and Concer	ntrates									
d here:	201	6	20)17	20	018	20:	19	2019 (Y	TD July)	2020 (\	(TD July)
oresented git Code)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
ру												
/												
		Vanadates										
d here: 2016 2017 2018 2019 (YTD July) 2020 (YTD July)												
nted by	201 Volume	6 Value (\$000)	20 Volume	017 Value (\$000)	20 Volume	018 Value (\$000)	20: Volume	19 Value (\$000)	2019 (Y Volume	TD July) Value (\$000)	2020 (Y Volume	(TD July) Value (\$000)
					Volume		volume		volume			
	Va	anadium Carbides										
d here:	201	6	20)17	20	018	20:	19	2019 (Y	TD July)	2020 (\	(TD July)
nted by	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
	Va	anadium Sulfates										
l here:												
ited by	201)17)18	20:		2019 (Y			(TD July)
	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)

				Identifysion	total number of outermars for this product estagen	If none input 0
					total number of customers for this product category.	
		omer Name (in ending order by period volume)	Re Country Destination	Common Ownership With Your Organization?	ed vanadium. If unable to provide data in Kg containe Primary End Use of Product	d vanadium, indicate unit used her Industry/Sector Represented Customer (NAICS)
E.	1					
с.	2 3					
	4 5					
	6 7					
	8					
	9 10					
			Re		total number of customers for this product category. ed vanadium. If unable to provide data in Kg containe	
		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented Customer (NAICS)
F.	1 2					
	3 4					
	5 6					
	7					
	8 9					
	10					
			Re		total number of customers for this product category. ed vanadium. If unable to provide data in Kg containe	
		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented Customer (NAICS)
G.	1 2					
	3					
	5 6					
	7					
	8 9					
	10					
				Identify your	total number of customers for this product category.	If none, input 0.
			Re	cord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	ed vanadium, indicate unit used he
		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented Customer (NAICS)
Н.	1 2					
	3					
	4 5					
	6					
	7 8					
	9 10					
				Identify your	total number of customers for this product category.	V If none, input 0.
			Re	ecord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	ed vanadium, indicate unit used he
		omer Name (in ending order by period volume)	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented Customer (NAICS)
I.	1 2					
	3 4					
	4 5					
	6 7					
	8					
	9 10					

	Vanadium Hydrides, Nitrides, Azides, Silicides, and Borides												
v	/anadium Hydrides, I	Nitrides, Azides, Si	ilicides, and Borides	5									
re:													
h	201	6	20)17	20)18	201	.9	2019 (Y	TD July)			
by	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)			
	Vanadium P	entoxide - Up to 9	99% purity										
re:													
h	201	6	20)17	20)18	201	.9	2019 (Y	TD July)			
by	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)			
	High Purity Van	adium Pentoxide	- 99%+ purity										
re:													
	201	.6	20)17	20)18	201	.9	2019 (Y	TD July)			
by	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)			
Oth	her Vanadium Oxide	s and Hydrovides ((Excluding Pentovid										
U		s and Hydroxides											
re:													
	201	.6	20)17	20)18	201	.9	2019 (Y	TD July)			
by	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)			
						(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		(, ,					
on o di u	m Decrima Foodated	ra (Ach. Dasiduas	Creat Catalusta, Cl										
anadiu	m-Bearing Feedstocl	ks (Ash, Residues,	Spent Catalysts, Sia	ag, Etc.)									
re:													
by	201	.6	20	017	20	018	201	.9	2019 (Y	TD July)			
	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)			
											-		

2020 (VTD July) Volume Value (\$000) 2020 (VTD July) 2020 (VTD July) 2020 (VTD July) Volume Value (\$000)
2020 (YTD July)
2020 (YTD July) Volume Value (\$000)
2020 (YTD July) Volume Value (\$000)
2020 (YTD July) Volume Value (\$000)

				Identify your	total number of customers for this product category.	If none, input 0.								
			Re	cord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	d vanadium, indicate unit used here								
		Customer Name	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented b Customer (NAICS)								
	1													
J.	2													
	3													
	5													
	6 7													
	8													
	9 10													
	10		1											
				Identify your	total number of customers for this product category.	If none, input 0.								
			Re	cord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	d vanadium, indicate unit used here								
		Customer Name	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented b Customer (NAICS)								
к.	1													
κ.	2 3													
	4 5													
	6													
	7 8													
	9													
	10													
	Identify your total number of customers for this product category. If none, input 0.													
	Identify your total number of customers for this product category. If none, input 0. Record data in Kg contained vanadium. If unable to provide data in Kg contained vanadium, indicate unit used here													
			Re	cord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	d vanadium, indicate unit used here								
		Customer Name	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented b Customer (NAICS)								
L.	1													
	3													
	4 5													
	6													
	7 8													
	9 10													
	10		1											
				Identify your	total number of customers for this product category.	If none, input 0.								
			Re	cord data in Kg containe	ed vanadium. If unable to provide data in Kg containe	d vanadium, indicate unit used here								
		Customer Name	Country Destination	Common Ownership With Your Organization?	Primary End Use of Product	Industry/Sector Represented b Customer (NAICS)								
M.	1													
	3													
	4 5													
	6													
	7 8													
	9													
	10	Comments:			I	1								
						BUS								

	Ferrovanadi	um - Under 80% \	/anadium									
ere:												
	2010	6	20)17	20)18	201	19	2019 (Y	TD July)	2020 (Y	TD July)
d by	Volume	Value (\$000)	Volumo	Value (\$000)	Volumo	Value (\$000)	Volume	Value (\$000)	Volumo	Value (\$000)	Valuma	Value (\$000)
	volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	volume	Value (\$000)	Volume	Value (\$000)	Volume	value (\$000)
	Ferrovan	adium - 80%+ Van	nadium									
ere:				-								
	2010	6	20)17	20	018	201	19	2019 (Y	TD July)	2020 (Y	'TD July)
d by												
	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
Vanadium Master Al			bys									
ere:												
	2010	6	20)17	20)18	201	19	2019 (Y	TD July)	2020 (Y	(TD July)
d by												
	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
Van	adium, Wrought and	d Unwrought (Exc	luding Master Alloy	ys)								
ere:												
	201	6	20)17	20	18	201	19	2019 (Y	TD July)	2020 (Y	(TD July)
d by	Valuma		Maluma) (aluma		Valuma		Volumo) (aluma a	
	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)
USINESS	CONFIDENTIAL - Per	Section 705(d) of	the Defense Produ	uction Act								

iere:											
	201	.6	20)17	7 2018		20:	2019		2019 (YTD July)	
d by	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	Volume	Value (\$000)	

				6. Finan					
		he following financial line items for your location	for the 201	6 - 2020 (YTD July)	period. For 2019	(YTD July) and 20	20 (YTD July), i	record the closest p	ossible number
		quested time period.		-					
		Income Statement Items:					2 222 22		/
ncon	ne S	tatement (Select Line Items)				housands, e.g. \$1			
				2016	2017	2018	2019	2019 (YTD July)	2020 (YTD Jul
4	۹.	Net Sales (and other revenue)		-					
		1 Defense-Related Sales Percentage							
		2 Non-U.S. Sales Percentage							
1 E		Cost of Sales / Cost of Goods Sold							
	C.	Depreciation and Amortization							
- H). 	Total Operating Income (Loss)							
		Earnings Before Interest and Taxes							
		Net Income							
		Balance Statement Items:							<u> </u>
Balan	nce S	heet (Select Line Items)				housands, e.g. \$1	-		
				2016	2017	2018	2019	2019 (YTD July)	2020 (YTD Jul
	Α.	Cash							
_	Β.	Inventories							
	C.	Current Assets							
2	D.	Total Assets							
_	Ε.	Current Liabilities							
	F.	Total Liabilities							
	G.	Retained Earnings							
	Η.	Total Owner's Equity							
		Other Items:							
Dthe	r Sel	ect Items				housands, e.g. \$1	-		
				2016	2017	2018	2019	2019 (YTD July)	2020 (YTD July
4	۹.	Research & Development (R&D) Expenditure							
		National Security/Critical Infrastructure-Relate	d R&D						
		Percentage (see Definitions tab)							
3 E	3.	Capital Expenditure (CapEx)							
Ŭ		National Security/Critical Infrastructure-Relate	d CapEx						
		Percentage (see Definitions tab)							
C	2.	Total Security Expenditures							
		1 Cybersecurity Expenditures Percentage							
		2 Physical Security Expenditures Percentage							
s you	ur or	ganization involved in any R&D work with the U.	6. Departme	ent of Defense?		If	yes, answer th	e following question	ns.
		Program Name	Contra	act Number					
-	٨								
4	Α.	++							
	Β.								
	C.								
		Comment:							

Data Confirmation
2019 Net Sales
None

Location – Division/Business Unit Corporate/Whole Organization

Pre ^r	vious Page						<u>Next P</u>		
				7. Employment					
Record the total number of full time equivalent (FTE) employees and contractors for the 2016 to 2020 period for U.S. facilities that produce subject products.									
			2016	2017	2018	2019	2020 (Current)		
	FTE Emp	ployees							
A	FTE Contractors								
	Production Line FTE Em	ployees or Contractors							
dei	ntify the key workforce issue	s your organization has exp	perienced or anticipates in the	e next five years.					
	Issi	ue	Primary Occupation Affected	Timeframe		Explain			
	Attracting Workers to Location								
	Employee Turnover								
в	Finding Experienced Workers		R	~					
U	Finding Qualified Workers			, , , , , , , , , , , , , , , , , , ,		Ongoing, Expected to Continue			
	Finding U.S. Citizens					Past Only (Resolved) Expected In Future			
	Significant Portion of Work	force Retiring				No or Not Applicable			
	Other	(specify)							
	Other	(specify)							
с	For 2019, indicate the perce organization's total operati personnel-related expendit	ng costs represented by		Engineers Information Technology Production Line workers					
D	Describe any significant changes in the recruitment, hiring and/or retension of human capital as a consequence of volatile vanadium prices.			Scientists Testing Operators, QC, & Technicians Other None	& Support				
E	If you resumed operations facility, do you reasonably a hire or rehire workers? Pro- long it would take to restor levels in the Explain box.	anticipate being able to vide an estimate of how		Explain:					
	Commer	nts:							
				L - Per Section 705(d) of the D	ofonce Dueduction Act				

Pre	vious Page					<u>Ne</u>	xt Page
			8. National Defense S				
А	Since 2016, has your organization directly or indi		ect product categories for incorpora	tion into U.S. defense s	systems or related installations? If no	<i>),</i>	
	proceed to the next tab. If yes, complete sections	s B, C and D.					
	From the list of U.S. Government agencies belo						
	U.S. Air Force		U.S. Coast Guard		Department of Energy (including National Labs)		
В	U.S. Army		U.S. Intelligence Community (such as CIA, NGA, NRO, NSA)		Other	(Identify Agency)	
	U.S. Marine Corps		Missile Defense Agency (MDA)		Other	(Identify Agency)	
	U.S. Navy		Defense Logistics Agency		Other	(Write-In)	
	In accordance with the header criteria, indicate v	which product categories you	directly or indirectly provide for U.S.	defense systems, instal	llations or known U.S. defense end u	ises.	
	Product	Defense Support?	Percentage of 2019 Sales Attributable to Defense Sales	Primary DOD ACA	AT/MDAP Supported, if known*	Comments	
	1 Vanadium Ores and Concentrates						
	2 Vanadates						
	3 Vanadium Carbides						
	4 Vanadium Sulfates						
	_ Vanadium Hydrides, Nitrides, Azides,						
	5 Silicides, and Borides	Direct					
с	6 Vanadium Pentoxide - Up to 99% purity	Both			Vanadium Ores and Concentrates Vanadates		
	7 High Purity Vanadium Pentoxide - 99%+ purity Unknown				Vanadium Carbides Vanadium Sulfates		
	8 Other Vanadium Oxides and Hydroxides (Excluding Pentoxide)				Vanadium Hydrides, Sulfides, Nitr Vanadium Pentoxide - Up to 99%	Vanadium	
	9 Vanadium-Bearing Feedstocks (Ash, Residues, Spent Catalysts, Slag, Etc.)			[High Purity Vanadium Pentoxide - Other Vanadium Oxides and Hydr Vanadium-Bearing Feedstocks (As		
	10 Ferrovanadium - Under 80% Vanadium				Ferrovanadium - 40-60% Vanadiu		
	11 Ferrovanadium - 80%+ Vanadium				Ferrovanadium - 80%+ Vanadium		
	12 Vanadium Master Alloys				Vanadium Master Alloys Vanadium, Wrought and Unwrou	ght (Excluding Master Alloys)	
	Vanadium, Wrought and Unwrought				Other Vanadium-Related		
	13 (Excluding Master Alloys)						_
*U.	S. Department of Defense Acquisition Category (A	CAT) and Major Defense Acqu	isition Program (MDAP)				
			DO Rated	DX Rated			
	Since 2018, provide the number of priority ra						
	under the Defense Priorities and Allocations (15 CFR part 700) that you have received by						
	DX).						
D.							
	 Since 2018, provide the number of priority rate have placed with other entities by their level 						
	have placed with other entities by their level	i or priority.					
	Since 2018, indicate which of your subject pr frequently received a priority rated contract		\checkmark				
	Comments:						
F		BUSINESS	CONFIDENTIAL - Per Section 705(d)	of the Defense Produc	tion Act		
L							

Prev	vious Page					Next Page			
			9. Critical Infrastructure						
	Describe your organization's support for each Critical Info	rastructure Sector in accordance with the head	er criteria.						
	Definitions of each sector may be found at: https://www.dhs.gov/cisa/critical-infrastructure-sectorsectors								
	Critical Infrastructure Sector	Sector Support	Primary Product Support	Primary Customer Associated with Sector/Product Support		Explain			
	Chemical Sector								
	Commercial Facilites Sector								
	Communications Sector			Vanadium Ores and Concentrates					
	Critical Manufacturing Sector		K	Vanadates					
	Dams Sector			Vanadium Carbides					
А	Defense Industrial Base Sector			Vanadium Sulfates Vanadium Hydrides, Sulfides, Nitrides, Silic	ides, and Borides				
	Emergency Services Sector			Vanadium Pentoxide - Up to 99% Vanadiun	n				
	Energy Sector			High Purity Vanadium Pentoxide - 99%+ Va Other Vanadium Oxides and Hydroxides (e:					
	Financial Services Sector			Vanadium-Bearing Feedstocks (Ash, Residu	-				
	Food and Agriculture Sector			Ferrovanadium - 40-60% Vanadium					
	Government and Facilities Sector			Ferrovanadium - 80%+ Vanadium Vanadium Master Alloys					
	Healthcare and Public Health Sector			Vanadium, Wrought and Unwrought (Exclu	ding Master Alloys)				
	Information Technology Sector			Other Vanadium-Related	1				
	Nuclear Reactors, Materials, and Waste Sector								
	Transportation Systems Sector								
	Waste and Wastewater Systems Sector								
	How have current market conditions involving the subject	ct product categories affected your ability to me	eet current Critical Infrastructure Sector rec	quirements?					
В.									
	Do you recommend any actions by the U.S. Government	to better facilitate your ability to meet current	Critical Infrastructure Sector requirements	;?					
C.									
	Comments:								
		BUSINESS CONFI	DENTIAL - Per Section 705(d) of the Defens	se Production Act					

jr	nce 2018, by subject product category and in accordance wit	n the header criteria has	10. Competition and Trade	ort competition? Do not limit your organization'	s response to the categories in which you operat
	u also have visibility into other product category imports.	r the neader entend, has	there been a significant change in impe		s response to the categories in which you operation
	Product Category	Change in Import Competition	Primary Source Country of Import Competition	Impact on Your Organization	Explain
1	Vanadium Ores and Concentrates				
2	Vanadates	K		<u>^</u>	
3	Vanadium Carbides				
4	Vanadium Sulfates		Increase		
5	Vanadium Hydrides, Nitrides, Azides, Silicides, and Borides		Decrease No Change		
6	Vanadium Pentoxide - Up to 99% purity				
7	High Purity Vanadium Pentoxide - 99%+ purity			Positive Negative	
8	Pentoxide)			Neutral	
9	Vanadium-Bearing Feedstocks (Ash, Residues, Spent Catalysts, Slag, Etc.)				
10) Ferrovanadium - 40-60% Vanadium				
11	1 Ferrovanadium - 80%+ Vanadium				
12	2 Vanadium Master Alloys				
13	Vanadium, Wrought and Unwrought (Excluding Master Alloys)				
Do	you anticipate any impact on your business due to future in	nports of subject product	s into the United States from any count	ry? Indicate your anticipated primary future sou	rce of import competition, the impact this
0	mpetition will likely have on your organization, and explain.				
	Product Category	Primary Future	Source of Import Competition	Primary Impact from Import Competition	Explain
1	Vanadium Ores and Concentrates				
	Vanadates				
	Vanadium Carbides				
4	Vanadium Sulfates			·	
5	Vanadium Hydrides, Nitrides, Azides, Silicides, and Borides				
6	Vanadium Pentoxide - Up to 99% purity				
7	High Purity Vanadium Pentoxide - 99%+ purity				
8	Other Vanadium Oxides and Hydroxides (Excluding Pentoxide)				
9	Vanadium-Bearing Feedstocks (Ash, Residues, Spent Catalysts, Slag, Etc.)				
10) Ferrovanadium - 40-60% Vanadium				
	Ferrovanadium - 80%+ Vanadium				
9	Vanadium Master Alloys				
	Vanadium, Wrought and Unwrought (Excluding Master Alloys)				

being the next most important issue/impact, etc.). Explain your response.

it issue/impact, etc.). Explain your response.

				1	
		Challenge/Issue	Challenge Experienced?	Rank Top 5	Explain
	1	Aging equipment, facilities, or infrastructure			
	2	Aging workforce			
	3	Counterfeit parts			
		Cyber security			
		Domestic competition			
		Environmental regulations/remediation			
		Export controls/ITAR & EAR			
		Financing/credit availability	-		
		Foreign competition			
		Government acquisition process			
		Government purchasing volatility			
		Government regulatory burden			
		Healthcare			
		Industrial espionage - domestic			
U. –		Industrial espionage - foreign			
		Input availability			
		Intellectual property/patent infringement			
		Labor availability/costs			
	10				
		Natural disasters (including disease/quarantine)			
		Obsolescence			
		Pension costs			
		Proximity to customers			
		Proximity to suppliers			
		Qualifications/certifications			
		Quality of inputs			
		R&D costs			
		Reduction in USG demand			
		Taxes Trade disputes/tariffs			
		Worker/skills retention			
		Other (specify)			
	31 32	Other (specify)			
[Des		r organization's competitive position in the marketplace for su parketplace.	bject product categories. Then, describ	e in detail both how long and in what manner this leading
		Challenge/Issue	How long and in what manner has this	affected your competitive position in t	he market for subject products? Describe.
D.	D. 1 (specify) 2 How can the U.S. Government aid in the response to/mitigation of this challenge?				
		Comments:			
			BUSINESS CONFIDENTIAL - Per Section 705(d) of the	e Defense Production Act	

	sulting from the COVID-19 pandemic at yo nost important impact/action, etc.):	our organizatio		D-19 Impacts the three most significant impacts a	nd three most important actions (1 b	eing the most important	Next Page
Impac	Impacts Experienced		Rank Top 3	Actions Taken		Short Term/ Long Term	Rank Top 3
Increased cost of materials	Increased cost of materials			Reduce workforce			-
Inability to access work location	Inability to access work location			Increase online/remote work capa	abilities		
Inability to fulfill contracts	Inability to fulfill contracts			Seek government assistance			
Reduced sales				Delay or reject new contracts			
Foreign supplier manufacturing delays				Begin to produce pandemic-related products			
Domestic supplier manufacturing delays				Increase use of domestic suppliers			
Increased demand				Reduce use of suppliers located in China			
A. Transportation-based disruptions				Reduce use of suppliers located o	utside the U.S. and China		
Financing difficulties				Increase inventories			
Labor shortages				Increase supplier redundancy			
Other	(specify)			Other	(specify)		
Other	(specify)			Other	(specify)		
	Identify any USG actions that could have better mitigated/prevented COVID-19 impacts to your organization:						
Identify any USG actions that will your organization:	Identify any USG actions that will limit future COVID-19-related impacts to your organization:						
Con	nments:						
	BUSINESS C	ONFIDENTIAL	- Per Sectio	on 705(d) of the Defense Productio	n Act		

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12. Certification							
The undersigned certifies that the information h	The undersigned certifies that the information herein supplied in response to this questionnaire is complete and correct to the best of his/her						
knowledge. It is a criminal offense to willfully ma	ake a false statement or representation to any department or agency of the United States Government						
as to any matter within its jurisdiction (18 U.S.C. 1001 (1984 & SUPP. 1197)).							
· - · ·	ey, save a copy and submit it via email to Vanadium232@bis.doc.gov. Be sure to retain your survey for						
your records and to facilitate any necessary edits	s or clarifications.						
Organization Name							
Organization's Internet Address							
Name of Authorizing Official							
Title of Authorizing Official							
E-mail Address							
Phone Number and Extension							
Date Certified							
In the box below, provide any additional comme	nts or any other information you wish to include regarding this survey assessment.						
How many hours did it take to complete this sur	vey?						
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act							