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

Section 232 Investigation: The Effect of Imports of Titanium Sponge on U.S. National Security

Producers and Melters Survey



## 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 U.S. titanium sponge production and titanium production. The survey results will be used to support an ongoing investigation of the effect of imports of titanium sponge on 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 titanium sponge is 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, mergers and acquisitions, joint ventures, imports and exports, supply chain networks, 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 titanium 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 Information furnished herewith is deemed confidential and will not be published or disclosed except in accordance with Section 705 of the Defense Production Act of 1950, as amended (50 U.S.C. Sec. 4555).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 11 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.

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	III. General Instructions
	Your organization is required to complete this survey of U.S. titanium sponge production and titanium production, using an Excel template, which can be downloaded from the BIS website: <a href="http://www.bis.doc.gov/TiSponge232">http://www.bis.doc.gov/TiSponge232</a>
A.	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. <b>DO NOT SUBMIT</b> 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.
В.	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. This is a comprehensive survey of sponge production and consumption. As such, some questions may not be relevant to your organization. Read each question carefully to ensure its applicability to your organization.
	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: <u>Titanium232@bis.doc.gov</u>
	Questions related to the survey should be directed to BIS survey support staff at <a href="mailto:Titanium232@bis.doc.gov">Titanium232@bis.doc.gov</a> .
E.	E-mail is the preferred method of contact.
	You may speak with a member of the BIS survey support staff by calling (202) 482-3110.
	For questions related to the overall scope of this Section 232 Investigation, contact <u>Titanium232@bis.doc.gov</u> or:
F.	Brad Botwin, Director, Industrial Studies Office of Technology Evaluation, BIS, Room 1093 U.S. Department of Commerce 1401 Constitution Avenue, NW Washington, DC 20230
	<b>DO NOT</b> submit completed surveys to Mr. Botwin's postal or personal e-mail address. All surveys must be submitted electronically to: <a href="mailto:titanium232@bis.doc.gov">titanium232@bis.doc.gov</a>
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Term	IV. Definitions  Definition
Authorizing Official	An executive officer of the organization or business unit or another individual who has the authority to execute this survey on behalf of the organization.
Applied Research	Systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met. This activity includes work leading to the production of useful materials, devices and systems or methods, including design, development, and improvement of prototypes and new processes.
Basic Research	Systematic, scientific study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind.
Capital Expenditures	Investments made by an organization in buildings, equipment, property, and systems where the expense is depreciated. This does not include expenditures for consumable materials, other operating expenses, and salaries associated with normal business operations.
Chlorination	As applied to titanium sponge production, chlorination is the process in which chlorine gas is introduced to rutile or ilmenite ore to produce titanium tetrachloride.
Crushing/Shearing	The process by which large masses of titanium sponge produced via chemical methods are reduced to smaller sizes suitable for melting into ingots and other forms.
Customer	Any organization (external or internal entity) for which your organization manufactures/processes any product comprised of, or containing, titanium in any form.
DPAS	The purpose of DPAS is to assure the timely availability of industrial resources to meet current national defense and emergency preparedness program requirements and to provide an operating system to support rapid industrial response in a national emergency. The Defense Production Act of 1950 authorized the President to require preferential treatment of national defense programs.
Electrolysis	As applied to titanium sponge production, electrolysis is the process used to separate magnesium and chloride into magnesium and chlorine, resulting in the recycling of magnesium and chlorine.
Exports	Shipments to destinations outside the United States, including shipments to Canada and Mexico.
Facility	A building or the minimum complex of buildings or parts of buildings in which an organization operates to serve a particular function, producing revenue, and incurring costs for the company. A facility may produce an item of tangible or intangible property or may perform a service. It may encompass a floor or group of floors within a building, a single building, or a group of buildings or structures. Often, a facility is a group of related locations at which organization employees work, together constituting a profit-and-loss center for the company, and it may be identified by a unique DUNS number.
Finishing	Finishing treats the exterior of a metal product with the application of a thin complementary layer. Finishing is performed to improve a metal object's appearance and/or durability, titanium finishing steps include heat treating, machining, grinding, sizing, cutting, flattening and other surface preparation processes as well as inspection and testing processes to ready the product for shipment to customers
Forging	This process shapes titanium metal through the application of localized compressive forces, usually a hammer or die. It can be performed at various temperatures depending on the requirement for the final product.
Full Time Equivalent (FTE) Employees	Employees who work for 40 hours in a normal work week. Convert part-time employees into "full time equivalents" by taking their work hours as a fraction of 40 hours.
Full Time Equivalent (FTE) Contractors	Contractors who work for 40 hours in a normal work week. Convert part-time contractors into "full time 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 divisions 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 in its construction. The number provides Customs and Border Protection (CBP) with a standardized method of tracking all merchandise imported into the United States and sets out the tariff rates and statistical categories.
Import Value	Values reported should be the CIF duty un-paid value.
Inventory	The goods or materials an organization holds for its own use or for the ultimate goal of sale, or disposition or future conversion, enrichment, fabrication, or other use. This is material to which your organization has title; this does not include holding material for third-party use or storage.

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Melting	This process heats titanium metal feedstock, including both scrap, sponge, and any alloy additions. This step is required to produce semi-fabricated titanium products, such as ingots.
Milling	This is the process of converting ingots and other melted forms into downstream products such as billet, bar, extrusions, plate, sheet, coil, tube and wire. Processes involved in milling include forging, hot rolling, cold rolling and finishing.
Major Non-NATO Ally Sales	Sales of titanium products to the militaries of Afghanistan, Argentina, Australia, Bahrain, Brazil, Egypt, Israel, Japan, Jordan, Kuwait, Morocco, New Zealand, Pakistan, the Philippines, Republic of Korea (South Korea), Thailand, and Taiwan (Republic of China).
NATO Military Sales	Sales of titanium products to militaries of North Atlantic Treaty Organization member states other than the United States. These states include Albania, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, and the United Kingdom
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 or facility involved in titanium production or consumption.
Product/Process Development	The systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.
Production	The process of transforming inputs (raw materials, semi-finished goods, subassemblies, ideas, information, knowledge) into goods or services.
Research & Development	Basic and applied research in the engineering sciences, as well as design and development of prototype products and processes. Efforts that an organization conducts towards innovating, introducing and/or improving products and processes.
Sales	All reported and unreported sales of titanium, including sales to end-users, and sales within divisions of the organization.
Scrap	Titanium metal that is recovered from the titanium manufacturing process or through dismantling older objects containing titanium. Scrap can be used as feedstock for a melt.
Sponge	A porous, brittle form of titanium created from the reduction of titanium tetrachloride. This is most frequently achieved through the Kroll process.
Sponge - Standard Quality	Titanium sponge with chemical compositions suitable for use in structural non-aerospace applications.
Sponge - Non-Rotating Aerospace	Titanium sponge with chemical compositions suitable for use in aerospace applications such as struts, turbine frames, exhaust sidewalls, and other static aerospace structures.
Sponge - Rotating Grade	Titanium sponge with chemical compositions suitable for use in aerospace applications such as blade rotors, shafts, fan and compressor blades, and shifters. The titanium sponge must be of sufficient quality to ensure zero-tolerance for structural failure.
Supplier	An entity from which your organization obtains inputs, which may be goods or services. A supplier may be another organization with which you have a contractual relationship, or it may be another facility owned by the same parent organization.
Titanium Tube	This is tube manufactured from titanium. It is primarily used in aerospace ducting applications since it does not have the strength for most hydraulic applications. It is also used power generation, chemical processing, and medical applications
Titanium-Related	Components/products produced and/or consumed by your organization that contain titanium metal.
United States	The "United States" or "U.S." includes the 50 states, Puerto Rico, the District of Columbia, Guam, the Trust Territories, and the U.S. Virgin Islands.
Vacuum Distillation	Reduction of titanium tetrachloride with magnesium metal in a reactor followed by a distillation process to remove magnesium and chlorine impurities.
	BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

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			1. Orga	nization Information			
	Provide the following information for your o	organization					
	Organization Name						
	Street Address						
	City						
Α.	State 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	art, by any priv	ate or government entity? In	dicate Yes/No, then identify the	ne entities below, if applicable	e. List entities	
	with at least 5% ownership.	1		T	l .		
	Entity Name	Global Hea	adquarters Street Address	Global Headquarters City	Global Headquarters	Global Headquarters	Ownership %
					State/Province	Country	
В.							
_		1.1			16 6 11: 1		
	For the listed titanium related activities, recin each category.	ord the number	er of facilities your organization	on owns that conduct these a	ctivities. If one facility does m	ore than one of the listed ac	tivities, count it
	in each category.						
	Activities		Number of U.S.	Located Facilities	Number of	Non-U.S. Located Facilities	
	Titanium Sponge Production						
	Titanium Melting						
	Titanium Recycling						
	Titanium Casting						
	Titanium Milling						
	Titanium Forging						
	Titanium Finishing						
C.	Aerospace Structural Parts (e.g. spars, ribs)						
	Aerospace High-impact Parts (e.g. landing g	ear)					
	Aerospace External Engine Parts (e.g. cowl,	fan)					
	Aerospace Internal Engine Parts (e.g. low prompressor)	essure					
	Titanium Satellite Components/Finished Par	rts					
	Land-Based Turbine Engine and Structural P	arts					
	Maritime Turbine Engine and Structural Par	ts					
	Chemical Processing Equipment (e.g. tubing						
	Specialty Titanium Parts Manufacturing (no aerospace)	t to include					
	Other (Explain in Comments)						
	Comments:						
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					uisitions, Divestitures and Joint			
				Merg	ers, Acquisitions, and Divestitur	es		
From 2015-2019, record the total n sure to report related private/publi				activities, product	development and design, and R&	D activities. Be		
Identify your organization's mergen	s, acquisitions, and div	estitures below, if applicable.					·	
Organization Name	Type of Activity	% of Equity Held by Partner Organization	Partner Organization Country Headquarters	Year Initiated	Primary Scope of Activity	Primary Purp	oose of Activity	Explain
1					see below section			
2								
3								
A. 4								
5								
6								
7								
8 9								
10					+			
11				1				
12								
13				İ				
14								
15								
					Joint Ventures			
From 2015-2019, record the total n including public/private partnership			nips related to all titanium	related activities, p	product development and design	, and R&D,		
Identify your organization's joint ve	nture relationships bel	ow, if applicable.						
Organization Name	Type of Joint Venture	% of Equity Held by Organization	Organization Country Headquarters	Year Initiated	Primary Scope of Relationship	Primary Purpos	se of Relationship	Explain
1					Titanium Sponge Production			
2					Titanium Melting			
B 3					Titanium Recycling Titanium Casting			
B. 4 5					Titanium Casting Titanium Milling			
6				<del> </del>	Titanium Forging			
7	1			<b>-</b>	Titanium Finishing			
8				1	Titanium Ore Mining			
9				1	Aerospace Structural Parts			
10					Aerospace High-impact Parts			
11					Aerospace External Engine			
12					Aerospace Internal Engine		ing Equipment (e.g.	
13				ļ	Titanium Satellite		Parts Manufacturing	
14	1			-	Land-Based Turbine Engine	Other (Explain	n in Comments)	
15				1	Maritime Turbine Engine and			
Comments:								
			BUSINE	SS CONFIDENTIAL	- Per Section 705(d) of the Defe	nse Production Act		

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						3. Facilities						
Identify all of your organization's facilities with to one operation, list each operation at the facility	itanium related operati	ions (e.g. sponge produc	ction, milling, forging, casting, ar	nd components) including facili	ties that are on standby/idled. Provid	ie the LOCATION (U.S. and Non	-U.S.) of the facility, indicate all	operations at each facility using	the drop down menus, and speci	fy any changes that may impact that fa	cility over the next five years. If a give	en facility has more than
one operation, list each operation at the facility	and the given operation	n's capacity on separate										
			Location			Facility 0	Operation	Facility	Capacity		Outlook	
Facility Name	City	State	Country	Facility Located in a Free Trade Zone?	Facility Located in an Opportunity Zone?	Operation Type	Facility Operating Status	Total Facility Capacity (MT)	Average Capacity Utilization Rate (Last Full Year of Operation)	Do you anticipate any significant changes in this particular operation the next five years?	If yes or unknown, provide a	brief explanation.
1				y/n	Y/N	Titanium Sponge Production				yes		
2				,	·	Titanium Melting				no		
3						Titanium Recycling Titanium Casting				unknown		
5						Titanium Milling						
6						Titanium Forging Titanium Finishing						
8						Titanium Finishing Titanium Ore Mining						
9						Aerospace Structural Parts						
10						Aerospace High-impact Parts Aerospace External Engine						
12						Aerospace Internal Engine						
13						Titanium Satellite						
15						Land-Based Turbine Engine Maritime Turbine Engine and						
16						Chemical Processing						
17						Specialty Titanium Parts Other (Explain in Comments)						
19												
20												
22												
23		L										
1 2 2 3 4 5 5 6 6 7 7 8 8 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1												
26												
27												
29		<b>†</b>	<u> </u>		+							
30												
31												
33												
34												
36												
37												
38												
40												
Has your organization benefited from being loca	ted in an opportunity z	one or would your organ	nization like more information r	egarding relocation to								
opportunity zones?												
If any of your organization's titanium spong	a production facilities	were idled in the 2015.2	010 or may be idled after 2019	how long would it take if nos	sible to restart operations at that shu	it down facility? Indicate the fac	tors that might inhihit restarting	onerations and the degree of in	nnact for each factor. Estimate th	e total costs associated with each facts	or and then evoluin your reasoning fo	r vour choices
in any or your organization's attainant spong	e production racinities	were raica in the 2015 2										
	Facility	y Name	Possible to Restart?	Estimated Time to Restart (in days)	Estimated Total Cost to Restart (in \$1000s USD)	Factors Inhi Factor	biting Restart	Estimated Cost of Each Factor (in \$1000s USD)	Time to Reach 100% Capacity Utilization	Cost to Reach 100% Capacity Utilization	Factors Inhibiting 100% Ca Factor	pcity Utilization  Degree of Impact
				uaysj	310005 030)	Factor	Degree of Impact High	(111 310005 03D)	Othization	Odlizacion	Factor	High
							Medium					Medium
							Low					Low
1							LOW		-			LOW
	Facility	y Name	Possible to Restart?	Estimated Time to Restart (in days)	Estimated Total Cost to Restart (in \$1000s USD)	Factors Inhi Factor	Degree of Impact	(in \$1000s USD)	Time to Reach 100% Capacity Utilization	Cost to Reach 100% Capacity Utilization	Factors Inhibiting 100% Ca Factor	Degree of Impact
				32,5,	720000 0007	Tuctor	Degree or impact	(			Tuctor	Degree or impact
2												
	Facilit	y Name	Possible to Restart?	Estimated Time to Restart (in days)	Estimated Total Cost to Restart (in \$1000s USD)	Factors Inhi Factor	biting Restart  Degree of Impact	Estimated Cost of Each Factor (in \$1000s USD)	Time to Reach 100% Capacity Utilization	Cost to Reach 100% Capacity Utilization	Factors Inhibiting 100% Ca Factor	pcity Utilization  Degree of Impact
				udysj	Ç2000S U3DJ	· uctui	Degree of Impact	[ \$20005 030]	Cuizduon	Cunzation	i actor	Degree of Impact
3												
											,	1
						1	1	1				F.
For any idled sponge facilities, explain the circumstances that led to idling in the comment box to the right.												
Is your organization considering the development of expanded and/or new titanium production capacity, whether inside or outside the United States? If yes, describe.												
production capacity, whether inside or outside	Y/N											
the United States? If yes, describe.												
			1									
Comments:												
comments:												
	1				District CO	NTIAL - Per Section 705(d) of the	Dofonco Broductico Act					
					BUSINESS CONFIDE	rener - Per Section 705(d) of the	e perense Production Act					

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Indian	. 16	r organization produced sponge between the ye	201F 2010 i=	aka kawasa aka sista		4. Production		anation D				y/n
		-2019, provide the following capcity utilization ra								ion this time nasia	d on our to costion D of	
roi yea	115 2013											
		Facility Name	2015 Capacity	/ Utilization Rate	2016 Capacity	Utilization Rate	2017 Capacity	Utilization Rate	2018 Capacity	Utilization Rate	2019 YTD (June) (	Capacity Utilization Rate
	1											
A	2											
	3											
	-	Type of Sponge (Record in Kilograms)	2	015	2	016	2	017	2	018	20	19 (YTD)
			Kilograms	Average cost per	Kilograms	Average cost per	Kilograms	Average cost per	Kilograms	Average cost per		Average cost per Kg to
			Produced	Kg to produce	Produced	Kg to produce	Produced	Kg to produce	Produced	Kg to produce	Kilograms Produced	produce
В	1	Standard Quality										
	2	Non-Rotating Aerospace										
	3	Rotating Grade										
If your	organiz	Total: ation has obtained qualification/certification to p	roduce Aerospace	Rotating Grade spor	nge provide the fol	lowing.			I	ı		
			1	2	3	4	5	6	7	8	9	10
	1	Organization Certifying										-
С	2	Date of Certification										
	-	Date of Certification										
	3	Description of Certification Process										
For all 1	titanium	products below answer the applicable question:	to your organizat	ions U.S. based proc	luction by year. Re	port all quantities in	kilograms for the	years 2015-2019.				
		Type of Titanium Metal		015	2	016	2	017		018	2010	(to date)
		(Record all Responses in Kilograms)	1	.013	2	016	2	017	-	018	201:	(to date)
	1	Titanium Ingot (Total)										
	1a	Titanium Ingot Containing Standard Quality										
		Sponge										
	1b	Titanium Ingot Containing Aerospace Non- Rotating Sponge										
	1c	Titanium Ingot Containing Rotating Grade										
	2	Sponge Titanium Billet (Total)										
	2a	Titanium Billet Containing Standard Quality										
D	2b	Sponge Titanium Billet Containing Aerospace Non-										
	2c	Rotating Sponge Titanium Billlet Containing Rotating Grade										
	3	Sponge Titanium Scrap										
	4	Titanium Bar										
	5	Titanium Plate										
	7	Titanium Tube										
	8	Titanium Sheet (Hot Rolled)										
	9	Titanium Sheet (Cold Rolled)										
	10	Titanium Coil										
	11	Other (Explain in Comments)										
If your	organiz	ration produces any of the below products indic	ate so in the box t	to the right. If yes, o	omplete sections	E and F. If no, proce	ed to the next pay	ze.				y/n
	Ė	Provide the median, and maximum quantities						·				
		of titanium scrap that can be used for the following parts.		Comments		Me	dian Scrap Quantit	ry (%)	M:	aximum Scrap Qua	ntity (%)	
	1	Aerospace Structural Parts (e.g. spars, ribs)										
	2	Aerospace High-impact Parts (e.g. landing gear)										
	3	Aerospace External Engine Parts (e.g. cowl, fan)										
E	4	Aerospace Internal Engine Parts (e.g. low										
	5	pressure compressor) Land-Based Turbine Engine and Structural Parts										
	6	Maritime Turbine Engine and Structural Parts										
	7	Chemical Processing Equipment (e.g. tubing)										
	8	Titanium Satellite Components/Finished Parts										
	9	Other (Explain in Comments) What percentage of your business (by weight)										
		What percentage of your business (by weight) is used for defense products vs. commercial products?		Defense	Products			Commerci	al Products		Co	mments
	1	Aerospace Structural Parts (e.g. spars, ribs)										
	2	Aerospace High-impact Parts (e.g. landing										
	3	gear) Aerospace External Engine Parts (e.g. cowl,										
	4	fan) Aerospace Internal Engine Parts (e.g. low										
F	5	pressure compressor) Land-Based Turbine Engine and Structural										
	6	Parts  Maritime Turbine Engine and Structural Parts										
	7	Chemical Processing Equipment (e.g. tubing)										
	8	Titanium Satellite Components/Finished Parts										
	9	Other (Explain in Comments)										
	10	Total (Explain in Comments)  Total (Explain in comments if defense plus										
	10	commercial does not equal 100%):									<u> </u>	
		Comments:										

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								<u> </u>				
For all	facilities owned by your organization (L	J.S. and non-U.S.) prod	ducing titanium sp	oonge use the drop down to select all rele	evant input costs to each facility. If you	facility is currently idled but	had production between 2	1015-2019, report for the ap	plicable years. All dollar valu	ues should be reported as \$3	000s USD.	
	Facility Location (City, State)	Country	Operating Status	Estimated Total Annual Operating Costs	Primary Inputs to Titanium Sponge Production	2015 Average Annual Cost of Input Used	2016 Average Annual Cos of Input Used	t 2017 Average Annual Cost of Input Used	2018 Average Annual Cost of Input Used		2019 YTD (June) Average Annual Cost of Input Used	Explain
			operating/idled		Labor							
					Electricity							
					Rutile							
					Ilmenite Coke							
					Chlorine							
1					Magnesium							
					TICI4							
					Slag							
					Inert Gas Transportation							
					Other Facility Overhead Costs							
					Labor							
					Electricity							
A.					Rutile Ilmenite							
					Coke							
2					Chlorine							
2					Magnesium							
					TiCl4							
					Slag Inert Gas							
					Transportation							
					Other Facility Overhead Costs							
					Labor							
					Electricity Rutile							
					Ilmenite							
					Coke							
2					Chlorine							
3					Magnesium							
					TiCl4 Slag							
					Siag Inert Gas							
					Transportation							
					Other Facility Overhead Costs							
		Comments:										
For all	of your organization's U.S. and non-U.S	6. ingot productions, us	se the drop down	to select all relevant input costs. The va	lues presented should be an average o	f all of your organization's in	got production operations.	All dollar values should be i	reported as \$1000s USD.			
		Priman	Innuts to Titaniu	m Ingot Production		2015 Average Annual Cost						Explain
		Filliary				of Input Used	of Input Used	of Input Used	of Input Used	Annual Cost of Input Used	Annual Cost of Input Used	
В.			Labor									
			Electrici Titanium S							<b></b>		
			Aluminu Aluminu							<del>                                     </del>		
			Vanadiu									
		Other All		specify in Comments)								
			Transport									
			Other Facility Ove	erhead Costs				1				
	Comments	s:										
						BUSINESS CO	ONFIDENTIAL - Per Section	705(d) of the Defense Produ	iction Act			
												-

Provide the following information regarding your organization's U.S. 2018 production capacity for the below that number of shifts/length of shift sheedule (expressed across U.S. facilities for the below products?    1   Standard Quality Sponge	Previous Page								Next Page
What is 2018 utilization reparring your organization's U.S. 2018 production capacity for the below titanium products?  What is 2018 utilization rate averaged arous U.S. facilities for the below products?  I Standard Quality Sponge  I Standard Quality Sponge  I Standard Quality Sponge  I Time needed to reach 100% capacity utilization? (Months)  I Time needed to rea	Trevious rage			6. Sur	ge Capacity				<u>Next rage</u>
What is 2018 utilization rate averaged across U.S. facilities for the below products?    I Standard Quality Sponge					ge eaparty				
What is 201s utilization rate veraged across U.S. Facilities for the below products of stiff-legish of stiff-l	Provide the following information regarding y	our organization's U.S. 2018 production capaci	ty for the below titanium products:						
A 2 Aerospace Non-flotating Sponge 3 Rotating Sponge 1 Trainium Indiget 2 Trainium Step 3 Trainium Step 4 Trainium Step 5 Trainium Mate 6 Trainium Step 9 Other (Explain in Comments)  1 Standard Quality Sponge C 2 Aerospace Non-flotating Sponge C 3 Rotating Sponge C 3 Rotating Sponge C 4 Trainium Step C 5 Trainium Step C 6 Trainium Step C 7 Trainium Step C 8 Trainium Step C 8 Trainium Step C 9 Other (Explain in Comments)  1 Standard Quality Sponge C 1 Standard Quality Sponge C 2 Aerospace Non-flotating Sponge C 3 Rotating Sponge C 3 Rotating Sponge C 4 Trainium Step C 5 Trainium Step C 6 Trainium Step C 7 Trainium Step C 8 Trainium Step C 9 Trainium Step C 9 Trainium Step C 1 Trainium Step C 1 Trainium Step C 2 Aerospace Non-flotating Sponge C 3 Rotating Sponge C 4 Trainium Step C 5 Trainium Step C 6 Trainium Step C 7 Trainium Step C 8 Trainium Step C 9 Trainium St			as number of shifts/length of				train personnel to reach 100% capacity	of FTE's required to reach	utilization (expressed as number of shifts/length of shift/days per week
3 Rotating Sponge 5 Trainium Rillet 7 Trainium Pate 6 Trainium Sheet 7 Trainium Tube 8 Trainium Sheet 9 Other (Explain in Comments)  1 Stondard Quality Sponge 2 Amount of Potential Surge capacity Utilization (MT) 1 Stondard Quality Sponge 2 Amount of Potential Surge capacity (USD)  1 Stondard Quality Sponge 2 Amount of Potential Surge capacity (USD)  2 Trainium Sheet 3 I Stondard Quality Sponge 4 Trainium Sheet 5 Trainium Sheet 6 Trainium Sheet 9 Other (Explain in Comments)  1 Stondard Quality Sponge 2 Amount of Potential Surge capacity (USD)  2 Amount of Potential Surge capacity (USD)  3 Rotation Short Sponge 4 Trainium Sheet 5 Trainium Sheet 6 Trainium Sheet 7 Trainium Sheet 9 Other (Explain in Comments)  4 Trainium Sheet 7 Trainium Sheet 9 Other (Explain in Comments)  5 Trainium Sheet 9 Other (Explain in Comments)  5 Trainium Sheet 9 Other (Explain in Comments)  6 Trainium Sheet 9 Other (Explain in Comments)  6 Trainium Sheet 9 Other (Explain in Comments)  7 Trainium Tube 8 Trainium Sheet 9 Other (Explain in Comments)  8 Trainium Sheet 9 Other (Explain in Comments)	1 Standard Quality Sponge								
1 Trainum leget 2 Trainum Strap 3 Trainum Strap 4 Trainum Bar 5 Trainum Sheet 7 Trainum Tube 8 Trainum Sheet 9 Other (Explain in Comments)  1 Standard Quality Sponge C 2 Aerospace Non-Rotating Sponge 3 Rotating Sponge C 2 Trainum light 1 Trainum light C 2 Trainum Sheet C 3 Trainum Sheet C 4 Trainum Tube C 5 Trainum Sheet C 6 Trainum Sheet C 7 Trainum Tube C 8 Trainum Sheet C 8 Trainum Sheet C 9 Other (Explain in Comments)  T 8 Trainum Sheet C 9 Other (Explain in Comments)  T 8 Trainum Sheet C 1 Trainum Ingot C 2 Trainum Shore C 3 Trainum Strap C 4 Trainum Ingot C 5 Trainum Strap C 6 Trainum Strap C 7 Trainum Strap C 8 Trainum Strap C 9 Trainum Strap C 9 Trainum Strap C 1 Trainum Strap C 1 Trainum Strap C 1 Trainum Strap C 2 Trainum Strap C 3 Trainum Strap C 4 Trainum Strap C 5 Trainum Strap C 7 Trainum Strap C 7 Trainum Strap C 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)  T 8 Trainum Strap C 9 Other (Explain in Comments)	A 2 Aerospace Non-Rotating Sponge								
2 Transum Billet	3 Rotating Sponge								
2 Transum Billet									
4 Trainium Bar   Improve									
B 5 Tanisum Plate	3 Titanium Scrap								
6 Titanium Sheet 7 Titanium Sheet 8 Titanium Sheet 9 Other (Explain in Comments)  Landard Quality Sponge 1 Standard Quality Sponge 2 A A Account of Potential Surge Capacity Peyond 100% capacity utilization? Inhibiting factors.  Landard Quality Sponge 3 Rorospace Non-Rotating Sponge 3 Rotating Sponge 4 Titanium Ingot 5 Titanium Billet 7 No 7 Titanium Billet 8 No 8 Titanium Sheet 9 Other (Explain in Comments)  A Mount of Potential Surge capacity? (Wonths)  Months)  Months  Mo	4 Titanium Bar								
7 Titanium Tube 8 Titanium Sheet 9 Other (Explain in Comments)  Do any factors exist that inhibit surge capacity beyond 100% capacity utilization?  If yes, list and describe the inhibiting factors.  Amount of Potential Surge Capacity Beyond 100% capacity Utilization (MT)  Utilization (MT)  Time needed to reach surge capacity? (Months)  Estimate costs to reach surge capacity? (Months)  Time needed to reach surge capacity? (Months)  Time needed to reach surge capacity? (Months)  Time needed to reach surge capacity? (Wonths)  Tital additional number of FTE's required to reach surge capacity? (Months)  Shift Schedule under surge capacity? of shift/days per week operational)  Tital num Berc  Tital num Ballet  No  Tital num Ba	B 5 Titanium Plate								
B Titanium Sheet   Do any factors exist that inhibit surge capacity beyond 100% capacity utilization?   If yes, list and describe the inhibiting factors.   If yes, list and	6 Titanium Sheet								
9 Other (Explain in Comments)  Do any factors exist that inhibit surge capacity beyond 100% capacity utilization?  If yes, list and describe the inhibiting factors.  If yes, list and describe the inhibiting factors.  If yes, list and describe the inhibiting factors.  If standard Quality Sponge capacity yes on the capacity beyond 100% capacity utilization (MT)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity yes of shift days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift/days per week operational)  I standard Quality Sponge capacity yes on the capacity yes of shift days per week operational)  I standard Quality Sponge capacity yes on the capacity yes of shift days per week operational)  I standard Quality Sponge capacity yes on the capacity yes of shift days per week operational)  I standard Quality Sponge capacity yes on the capacity yes on the capacity yes of shift days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift days per week operational)  I standard Quality Sponge capacity yes on the capacity of shift days per week o	7 Titanium Tube								
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C 2 Aerospace Non-Rotating Sponge				Surge Capacity Beyond 100% Capcity	surge capacity?		train personnel to reach surge capacity?	of FTE's required to reach	(expressed as number of shifts/length
3   Rotating Sponge	1 Standard Quality Sponge								
1 Titanium lingot	C 2 Aerospace Non-Rotating Sponge								
2   Titanium Billet	3 Rotating Sponge								
3   Titanium Scrap	1 Titanium Ingot	Yes							
4   Titanium Bar	2 Titanium Billet	No							
D 5 Titanium Plate	-					<u> </u>			
6 Titanium Sheet 7 Titanium Tube 8 Titanium Sheet 9 Other (Explain in Comments)  Comments:									
7 Titanium Tube 8 Titanium Sheet 9 Other (Explain in Comments)  Comments:	D 5 Titanium Plate								
8 Titanium Sheet 9 Other (Explain in Comments)  Comments:									
9 Other (Explain in Comments)  Comments:									
Comments:									
	9 Other (Explain in Comments)								
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act	Comments:								
		•	BUSINESS (	ONFIDENTIAL - Per Sect	ion 705(d) of the Defer	nse Production Act			

ovide all	U.S. inve	ntories held directly or indirectly by you for the 2015 to 2018 period, current as	of the end of calendar year 2	2018.				
			Working Inver					
licata til		our organization maintains in working inventory, and the amounts of each in inv			nte in hilaneama (funus	aranaisation has more th	an one allow of a siven	acadust in inventor
each al	loy separa	ur organization maintains in working inventory, and the amounts of each in inv ately. (e.g., if your organization has Titanium Billet with Alloys A and B, provide t I as the combination of work-in-progress material and finished material held as	wo entries for Titanium Billet	with 'A' in the Alloy co	lumn for the first entry a	organization has more tr and 'B' in the Alloy column	n for the second). For the	nis question, workin
		Types of Titanium in Inventory	Alloy	2015	2016	2017	2018	Comments
	1 2	Titanium Sponge - Standard Grade						
	3	Titanium Sponge - Rotating Grade Titanium Sponge - Aerospace Non-Rotating Grade						
	4	Titanium Ingot Containg Standard Grade Sponge						
	6	Titanium Ingot Containg Rotating Grade Sponge Titanium Ingot Containg Aerospace Non-Rotating Grade Sponge						
	7 8	Titanium Billet Containing Standard Grade Sponge Titanium Billet Containing Rotating Grade Sponge						
	9	Titanium Billet Containing Aerospace Non-Rotating Grade Sponge						
	10 11	Titanium Scrap Titanium Bar						
	12	Titanium Plate						
	13 14	Titanium Sheet (Hot Rolled) Titanium Sheet (Cold Rolled)						
	15	Titanium Tube						
	16 17	Titanium Coil Titanium Satellite Components/Finished Parts						
	18	Aerospace Structural Parts (e.g. spars, ribs)						
Α	19 20	Aerospace High-impact Parts (e.g. landing gear)						1
	21	Aerospace External Engine Parts (e.g. cowl, fan) Aerospace Internal Engine Parts (e.g. low pressure compressor)						
	22	Land-Based Turbine Engine and Structural Parts  Maritime Turbine Engine and Structural Parts			-		1	
	24	Other (Explain in Comments)						
	25							
	26 27							
	28							
	29 30							
	31							
	32 33							
	34							
	35 36							
	37							
	38 39							
	40							
each al	tanium yo	ur organization maintains in strategic inventory, and the amounts of each in invately, (e.g., if your organization has Titanium Billet with Alloys A and B, provide to	wo entries for Titanium Billet	period. Report all amou with 'A' in the Alloy co	unts in kilograms. If your	organization has more t	han one alloy of a given	product in inventor
each al	tanium yo	ately. (e.g., if your organization has Titanium Billet with Alloys A and B, provide t as material kept by your organization as a reserve or hedge against supply disr	entory for the 2015 to 2018 p wo entries for Titanium Billet uption, market conditions, et	period. Report all amou with 'A' in the Alloy co c.	lumn for the first entry a	and 'B' in the Alloy column	n for the second). For the	nis question, strateg
each al	tanium yo loy separa is defined	ately. (e.g., if your organization has Titanium Billet with Alloys A and B, provide to las material kept by your organization as a reserve or hedge against supply disru	entory for the 2015 to 2018 p wo entries for Titanium Billet	period. Report all amou with 'A' in the Alloy co	unts i <b>n kilograms</b> . If your lumn for the first entry a 2016	organization has more ti and "B" in the Alloy column 2017	han one alloy of a given n for the second). For the	nis question, strateg
each al	tanium yo	stely, (e.g., if your organization has Titanium Billet with Alloys A and B, providet las material kept by your organization as a reserve or hedge against supply disr Types of Titanium Sponge - Standard Grade Titanium Sponge - Standard Grade Titanium Sponge - Rotating Grade	entory for the 2015 to 2018 p wo entries for Titanium Billet uption, market conditions, et	period. Report all amou with 'A' in the Alloy co c.	lumn for the first entry a	and 'B' in the Alloy column	n for the second). For the	nis question, strateg
each al	tanium yo loy separa is defined	stely, (e.g., if your organization has Titanium fillet with Alloys A and 8, providet is a material kept by your organization as a reserve or hedge against supply disr  Types of Titanium in Inventory  Titanium Sponge - Standard Grade  Titanium Sponge - Rotating Grade  Titanium Sponge - Rotating Grade  Titanium Sponge - Rotating Grade	entory for the 2015 to 2018 p wo entries for Titanium Billet uption, market conditions, et	period. Report all amou with 'A' in the Alloy co c.	lumn for the first entry a	and 'B' in the Alloy column	n for the second). For the	nis question, strateg
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А	Did your organization directly	y or indirectly supply titanium products for U.S. d		Defense Support ween 2015 and 201	9? If no, proceed to	next tab. If yes, co	mplete sections B,	C, and D below.	yes/no				
	From the list of U.S. Gove	ernment agencies below, select those whose syste	ems you supported	between 2015 and	2019.								
	U.S. Air Force		yes/no		U.S. Coast Guard		yes/no	Department of Energy	yes/no				
В	U.S. Army		ye	s/no	U.S. Intelligence Community (such as CIA, NGA, NRO, NSA)		yes/no	Other (Specify to the Right)	write in				
	U.S. Marine Corps		ye	s/no		e Agency (MDA)	yes/no	Other (Specify to the Right)	write in				
	U.S. Navy		ye	s/no	Defense Logist	ics Agency	yes/no	Other (Specify to the Right)	write in				
	Identify the specific U.S. Government programs/systems your organization has supported since 2015. In the first column, write-in the DEFENSE SYSTEM NAME. Provide as much detail as possible and spell out acronyms. The AGENCY NAME column dropdown will be populated with the agencies you identified above (in part B), select the applicable agency.  In the TITANIUM-RELATED PRODUCT columns, write in the products that your organization has provided. If additional products are provided in support of a specific government program/system, repeat the program/system on a new row and select the remaining products.  NOTE: If your organization is unsure of the specific GOVERNMENT PROGRAM/SYSTEM NAME or AGENCY NAME, provide as much information as possible. Do not disclose any classified information.												
		Defense System Name	Agency Name (select from dropdown)	Estimated Total Amount of Titanium Provided for System (Kilograms)	Titanium Product and/or Finished Good 1	Titanium Product and/or Finished Good 2	Titanium Product and/or Finished Good 3	Titanium Product and/or Finished Good 4	Titanium Produ and/or Finishe Good 5				
	1												
	2												
	3												
	4												
	5												
С	6												
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	16												
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	18												
	19												
	20												
D		's titanium related contracts rated under the ns System (DPAS)? Further information about ps://www.dcma.mil/DPAS/	yes/no	If yes, specify the nature and product of the DPAS rating.									
	Con	nments:											
		RUCINESS CONES	DENTIAL - Dar Sact	ion 705(d) of the De	ofense Production	Δrt							

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	From the list of Critical Infra	etructura Sactore halaw indicat	a which coctors your organization		ritical Infrastructure	may be found at a https://www.	.dhs.gov/cisa/critical-infrastructure-sectors	
	Chemical Sector (e.g. pipes and tubes for chemical factories, pressure vessels, heat exchangers)	y/n	Dams Sector (e.g. titanium parts for electric turbines used	y/n	Financial Services Sector (e.g. titanium parts for data systems used by financial services firms)	y/n	Information Technology Sector (e.g. titanium parts for batteries)	y/n
	Commercial Facilities Sector (e.g. cladding, structural supports)	y/n	in dams)		Food and Agriculture Sector (e.g. titanium parts used in agricultural equipment)	y/n	Nuclear Reactors, Materials, and Waste Sector (e.g. waste storage, pipes and tubing for reactors, reactor shields)	y/n
А	Communications Sector (e.g., titanium parts for communications satellites)	у/п	Emergency Services Sector (e.g. titanium applications for police, fire, and EMS)	у/п	Government and Facilities Sector (e.g. titanium parts provided for end use in U.S. government facilities)	y/n	Transportation Systems Sector (e.g. civil aviation, titanium parts for oil and gas pipelines, titanium parts for motor vehicles, ships, and railroad equipment)	y/n
	Critical Manufacturing Sector (e.g. titanium parts for various industrial machinery, titanium parts for aircraft engines)	y/n	Energy Sector (e.g. titanium parts for solar panels, titanium turbine parts, pipes for power plants)	у/п	Healthcare and Public Health Sector (e.g. replacement joints, prosthetics, medical instruments)	y/n	Water and Wastewater Systems Sector (e.g. pipes for water and sewer and treatment plant systems)	y/n
			n, write-in the CRITICAL INFRASTE is already reported in the Nation		de as much detail as possible and spell out	all acronyms. The SECTOR NA	ME column dropdown will be populated with	the sectors you identified above
	In the <b>TITANIUM-RELATED F</b> remaining products.	PRODUCT columns, state the tita	anium-related products your org	anization provides in support of	the specific sector. If additional products a as possible. Do not disclose any classifier		cific sector, repeat the program/system on a n	ew row and select the
		Critical Infrastructure System	Sector Name (select from dropdown)	Titanium-Related Product 1	Titanium-Related Product 2	Titanium-Related Product 3	Titanium-Related Product 4	Titanium-Related Product 5
	1							
	2							
	3							
	4							
	5							
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	19							
	20							
	Commen	ts:		1		ı		ı
				BUSINESS CONFIDENTIAL - Pe	r Section 705(d) of the Defense Productio	n Act		
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For	each type of titanium input purchased (p	urchases include both dome	stic and imports) b	y your organization from 2015-2019, state	e the supplier, amounts purchased, and p	10. Suppliers/Purchases prices paid. When applicable specify the a	lloy.										
						Slag (Kilograms)											
Idon	ntify your organization's total number of s	uppliers for Class Where															
	essary, input 0.	appliers for stag, where															
								21	)15	20	016	20	017	20	118	20	019
	Supplier	Supplier Headquarters	Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)
	1						Commercial										
+	2						Research U.S. Government (Non-defense)										1
A	4						U.S. Government (Defense)										
	5						Other Unknown										
	7						Unknown										
	8																
	9																-
	10					Rutile (Kilorams)											
Idor	ntify your organization's total number of s	uppliers for Putile Where															
nece	essary, input 0.	appliers for Kutile. Where															
_								21	015	20	016	20	017	20	118	2/	019
	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use					Volume			Value (\$USD)		Value
-			Related Faity:	nom supplier)				volume	Value (\$USD)	volume	Value (\$USD)	volume	Value (\$USD)	Volume	value (\$USD)	volume	(\$USD)
	2																
	3																
В	5																<del>                                     </del>
	6																
	7																
	9																$\vdash$
	10																
						Ilmenite (Kilograms)											
Iden	ntify your organization's total number of s	unnliers for Ilmenite Where	,														
	essary, input 0.	applicia for illiferite. Where															
1	Supplier	Supplier Headquarters		Manufacturer/Processor (if different	Country of Titanium Origin	Alloy	End-Use	21	)15	20	016	20	017		18		Value
1	Заррны	Supplier Headquarters	Related Party?	from supplier)	Country of Fitalitati Origin	Alloy	Lild OSC	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	(\$USD)
	1																
	2		-														-
С																	
	5																<del></del>
	7		1														
	8																
	9																<u> </u>
_	10					Titanium Sponge Standard Quality (Kil	ograms)										
						, (	-87										
	ntify your organization's total number of s nge - Standard Quality. Where necessary,																
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							-	M.F.	20	24.5	-		20	40	24	240
1	Supplier	Supplier Headquarters	Is the Supplier a	Manufacturer/Processor (if different	Country of Titanium Origin	Alloy	End-Use		015		016		017		18		Value
			Related Party?	from supplier)				Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	(\$USD)
	1										1					1	<del>                                     </del>
	2 3																
D	4																
	5																1
	7																
	9												-				+
	10		1								1	<b> </b>				<b> </b>	

					Titar	nium Sponge Aerospace Non-Rotating	Quality (Kilograms)										
Identify your of Sponge - Aeros	organization's total number or ospace Non-Rotating Quality.	f suppliers for Titanium Where necessary, input 0.															
	Constan	Supplier Headquarters	Is the Supplier a	Manufacturer/Processor (if different	Country of Titanium Origin	Aller	End-Use	20	015	20	016		2017	2	018	20	019
	Supplier	Supplier Headquarters	Related Party?	from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)
1																	,,,,,
2																	
E 4																	
5																	
7																	
8																	
10																	
					Titar	ium Sponge Aerospace Rotating Parts	Quality (Kilograms)										
Identify your o	organization's total number o	f suppliers for Titanium															
Sponge - Aero	ospace Rotating Parts Quality.	Where necessary, input 0.															
			Is the Supplier a	Manufacturer/Processor (if different				20	015	20	016		2017	2	018	20	019
	Supplier	Supplier Headquarters	Related Party?	from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)
1																	(+552)
3															1		-
F 4																	
5																	
7																	
8																	
10																	
		<u> </u>				Titanium Scrap (Kilogram	s)	<u>'</u>	<u> </u>								
Identify your o	organization's total number o	f suppliers for Titanium Scrap.															
Where necess	sary, input 0.																
								21	015	20	016	:	2017	2	018	20	019
	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use		O15 Value (SUSD)		016 Value (SUSD)						Value
1	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	20 Volume	Value (\$USD)	Volume	Value (\$USD)	2 Volume	018 Value (\$USD)		
1 2	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
2 3	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
2 3 G 4 5	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
2 3 4 5 6	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
2 3 4 5 6 7 8	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
2 3 G 4 5 6 7 8	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
2 3 6 4 5 6 7 8	Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy  Titanium Ingot (Kilogram											Value
2 3 6 4 5 6 7 8 9			Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin												Value
2 3 4 5 6 7 8 9 10	organization's total number o		Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin												Value
2 3 4 5 6 7 8 9 10 Identify your or	organization's total number o		Related Party?	from supplier)	Country of Titanium Origin			Volume		Volume		Volume		Volume		Volume	Value
2 3 4 5 6 7 8 9 10 Identify your or	organization's total number o		Related Party?	from supplier)  Manufacturer/Processor (if different	Country of Titanium Origin  Country of Titanium Origin			Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 4 5 6 7 7 8 9 10 Identify your c	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)		Titanium Ingot (Kilogram	5)	Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 4 5 6 7 8 9 10 Identify your or	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)  Manufacturer/Processor (if different		Titanium Ingot (Kilogram	5)	Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 3 6 4 5 6 7 8 9 10 Udentify your c Where necess	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)  Manufacturer/Processor (if different		Titanium Ingot (Kilogram	5)	Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 4 5 6 6 7 8 9 9 10 1 Identify your c Where necess	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)  Manufacturer/Processor (if different		Titanium Ingot (Kilogram	5)	Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 3 6 4 5 6 6 7 8 8 9 10 Uther enecess 1 2 2 3 3 H 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)  Manufacturer/Processor (if different		Titanium Ingot (Kilogram	5)	Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 6 4 5 6 7 7 8 9 100 MHz 10	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)  Manufacturer/Processor (if different		Titanium Ingot (Kilogram	5)	Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)
2 3 3 6 4 5 6 6 7 8 8 9 10 Uther enecess 1 2 2 3 3 H 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	organization's total number or sary, input 0.	suppliers for Titanium Ingot.	Related Party?	from supplier)  Manufacturer/Processor (if different		Titanium Ingot (Kilogram	5)	Volume	Value (SUSD)	Volume 20	Value (\$USD)	Volume	Value (SUSD)	Volume 2	Value (\$USD)	Volume 20	Value (\$USD)

					Titanium Slab (Kilograms)											
dentify your organization's total numb	per of suppliers for Titanium Slah															
Where necessary, input 0.	cer or suppliers for recultant stab.															
							20	15	20	016	2	017	21	018	20	19
Supplier	Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use										Value
		Related Party?	from supplier)				Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	(\$USD)
1																
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5																
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					Titanium Billet (Kilograms)											
dentify your organization's total numb Where necessary, input 0.	per of suppliers for Titanium Billet.															
		Is the Supplier a	Manufacturer/Processor (if different				20	15	20	016	2	017	20	018	20	19
Supplier	Supplier Headquarters	Related Party?	from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value
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J 4																
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6 7 8 9																
6 7 8 9					Titanium Bar (Kilograms)											
6 7 8 9 10 10 dentify your organization's total numb	per of suppliers for Titanium Bar.				Titanium Bar (Kilograms)		20	15	20	016	2:	017	21	018	20	19
dentify your organization's total numb	per of suppliers for Titanium Bar.  Supplier Headquarters	Is the Supplier a Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Titanium Bar (Kilograms) Alloy	End-Use		15 Value (\$USD)	20 Volume	016 Value (\$USD)		D17 Value (\$USD)		018 Value (SUSD)	20 Volume	19 Value (\$USD)
dentify your organization's total numb Where necessary, input 0.  Supplier				Country of Titanium Origin		End-Use										Value
dentify your organization's total numb Where necessary, input 0.				Country of Titanium Origin		End-Use										Value
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 3 4 4 4				Country of Titanium Origin		End-Use										Value
dentify your organization's total numb Where necessary, input 0.  Supplier				Country of Titanium Origin		End-Use										Value
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 3 4 4 4				Country of Titanium Origin		End-Use										Value
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6				Country of Titanium Origin		End-Use										Value
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dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 3 K 4 5 6 7 8				Country of Titanium Origin	Alloy	End-Use										Value
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 4 5 6 7 8 9	Supplier Headquarters	Related Party?		Country of Titanium Origin		End-Use										Value
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6 7 8 9 10  dentify your organization's total numb	Supplier Headquarters	Related Party?	from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume		Volume		Volume		Volume			Value (\$USD
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6 7 8 9 10  dentify your organization's total numb	Supplier Headquarters	Related Party?		Country of Titanium Origin  Country of Titanium Origin	Alloy	End-Use End-Use	Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USD
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 4 5 6 7 8 9 10 10 dentify your organization's total numb Where necessary, input 0.	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USD
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 4 5 6 7 8 9 10 10 dentify your organization's total numb Where necessary, input 0.	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USE
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6 7 8 9 10  dentify your organization's total numb Where necessary, input 0.	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USE
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6 7 8 9 10  dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 3	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USE
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6 7 8 9 10  dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 L 4 5 6	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USE
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 3 K 4 5 6 7 8 9 10  dentify your organization's total numb Where necessary, input 0.  Supplier	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USE
dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 K 4 5 6 7 8 9 10  dentify your organization's total numb Where necessary, input 0.  Supplier  1 2 3 L 4 5 6	Supplier Headquarters  Supplier Headquarters  over of suppliers for Titanium Plate.	Related Party?	from supplier)  Manufacturer/Processor (if different		Alloy  Titanium Plate (Kilograms)		Volume	Value (\$USD)	Volume 20	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume 20	Value (\$USD

					Titanium Sheet (Kilogram	s)										
dentify your organization's total number of supp Where necessary, input 0.	liers for Titanium Sheet.															
			6 . 5- 05 05				2	015	2	016	- :	017	2	018	20	119
Supplier	Supplier Headquarters	Related Party?	Manufacturer/Processor (if different from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USE						
1																
2																
1 4																
5																
7																
8																
10																
					Titanium Tube (Kilogram:	5)										
entify your organization's total number of supp here necessary, input 0.	liers for Titanium Tube.															
Constitution of the Consti		Is the Supplier a	Manufacturer/Processor (if different	Country of The class Oxfolia	Aller	End-Use	2	015	2	016	:	017	2	018	20	119
	Supplier Headquarters	Related Party?	from supplier)	Country of Titanium Origin	Alloy	Ena-Use	Volume	Value (\$USD)	Volume	Valu (\$US						
2																
3																
4 5																
6																
7 8																
9																
10																
					Titanium (Other - Explain in Con	nments)										
entify your organization's total number of supp ther). Where necessary, input 0.	liers for Titanium															
Superline (		Is the Supplier a	Manufacturer/Processor (if different	Country of Theories Oxford	Aller	Fod Hos	2	015	2	016		017	2	018	20	19
Supplier	Supplier Headquarters	Related Party?	from supplier)	Country of Titanium Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USE						
1																
2																
4																
5																
7																
8							1							1		
10																
Comments	•															
Comments:																
				DI ICINIECC CON	IFIDENTIAL - Per Section 705(d) of t	- Defense Bandontina Aut										

Previous For each		nization from 2015-2019, stat	e the customer (both U.S. and	non-U.S.), ammount sold, and price recei	ved. When applicable, specify the alloy.	11. Customers											Next Page
						anium Sponge Standard Quality (Kilograr	ns)										
Identify	your organization's total number o	of customers for Titanium Spor necessary, input 0.	nge - Standard Quality. Where		110	anium sponge standard Quanty (knograf	13)										
	Customer	Customer Headquarters	Is This Customer a Related Party?	End User (If Different from Customer)	Country of Titanium Sponge Origin	Alloy	End-Use		Value (\$USD)	Volume 2	Value (\$USD)		Value (\$USD)		2018 Value (\$USD)		2019 Value
1			Yes				Commercial	voidine	Value (5035)	voidine	Value (5035)	Volume	value (\$035)		Value (\$050)		(\$USD)
2			No				Research										
A 3							U.S. Government (Non-defense) U.S. Government (Defense)										+
5							Other										
6							Unknown										
8																<del>                                     </del>	<del>                                     </del>
9																	
10					Titanium S	ponge Aerospace Non-Rotating Quality (	Kilograms)										
Identify	y your organization's total number Quality.	of suppliers for Titanium Spon Where necessary, input 0.	ge - Aerospace Non-Rotating														
	Customer	Customer Headquarters	Is This Customer a Related Party?	End User (If Different from Customer)	Country of Titanium Sponge Origin	Alloy	End-Use		Value (\$USD)		Value (\$USD)		Value (\$USD)		2018 Value (\$USD)		Value (\$USD)
2																	
B 4																	
7																-	-
8																	
9																	-
10					Titanium S	ponge Aerospace Rotating Parts Quality	Kilograms)										
Identify	y your organization's total number of Quality.	of suppliers for Titanium Spon Where necessary, input 0.	ge - Aerospace Rotating Parts														
1	Customer	Customer Headquarters	Is This Customer a Related Party?	End User (If Different from Customer)	Country of Titanium Sponge Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume	Value (\$USD)		Value (\$USD)	Volume	2018 Value (\$USD)		Value (\$USD)
2																	
C 4																<del>                                     </del>	<del>                                     </del>
5																	
7																<del>                                     </del>	<del>                                     </del>
8																	
9																-	
10						Titanium Scrap (Kilograms)											
Identify	y your organization's total number	of customers for Titanium Scra	ap. Where necessary, input 0.														
1	Customer	Customer Headquarters	Is This Customer a Related Party?	End User (If Different from Customer)	Country of Titanium Scrap Origin	Alloy	End-Use	Volume	Value (\$USD)	Volume 2	Value (\$USD)		Value (\$USD)	Volume	2018 Value (\$USD)		Value (\$USD)
2		1							$\vdash$				1			<del></del>	₩-
D 4																	
5																<del>                                     </del>	1
7																	
8																	-
10																	
						Titanium Ingot (Kilograms)											
Identify	y your organization's total number	of customers for Titanium Ingo	ot. Where necessary, input 0.														
1	Customer	Customer Headquarters	Is This Customer a Related Party?	End User (If Different from Customer)	Country of Ingot Fabrication	Alloy	End-Use		Value (\$USD)	Volume 2	Value (\$USD)		Value (\$USD)		2018 Value (\$USD)		Value (\$USD)
2																<u> </u>	
E 4																	+
5																	
6																	+
8																	
9		+											1		-	<del> </del>	-

					Titanium Billet (Kilograms)											
ur organization's total numb	er of customers for Titanium Bille	t. Where necessary, input 0.														
Customer	Customer Headquarters	Is This Customer a Related	End User (If Different from Customer)	Country of Billet Fabrication	Alloy	End-Use	2015			016		017		2018		D 201
		Party?					Volume \	/alue (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	9
																+
																1
																+
																I
																$^{+}$
																_
					Titanium Bar (Kilograms)											_
ur organization's total numb	per of customers for Titanium Bar	. Where necessary, input 0.														
Customer	Customer Headquarters	Is This Customer a Related	End User (If Different from Customer)	Country of Bar Fabrication	Alloy	End-Use	2015			016		017		2018	YTE	
customer	customer rieauquarters	Party?	Life oser (ii billerent irolli customer)	Country of bar rabrication	Alloy	LIN OSC	Volume \	/alue (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	,
																4
							+ +	+							1	۲
																Ξ
																۲
_																
																-
																Ξ
					Titanium Plate (Kilograms)											
r organization's total numb	er of customers for Titanium Plat	e. Where necessary, input 0.														
							2045		20	46		047	VTC	2018	YTE	D .
Customer	Customer Headquarters	Is This Customer a Related	End User (If Different from Customer)	Country of Plate Fabrication	Alloy	End-Use	2015			016		017				
		Party?	,	,	,		Volume \	/alue (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	!
																4
																+
																I
																٦
																_
																_
					Titanium Sheet (Kilograms)											
r organization's total numbe	er of customers for Titanium Shee	et. Where necessary, input 0.			Titanium Sheet (Kilograms)											
r organization's total numbe	er of customers for Titanium Shee				Titanium Sheet (Kilograms)		2015		2(	016	2	017	YTC	2018	YTE	D
organization's total numbe	er of customers for Titanium Shee	Is This Customer a Related	End User (If Different from Customer)	Country of Sheet Fabrication	Titanium Sheet (Kilograms)  Alloy	End-Use	2015 Volume			016 Value (SUSD)		017 Value (SUSD)		2018 Value (\$LISD)	YTE	
			End User (if Different from Customer)	Country of Sheet Fabrication		End-Use		i Value (\$USD)		016 Value (\$USD)		017 Value (\$USD)		2018 Value (\$USD)		
		Is This Customer a Related	End User (if Different from Customer)	Country of Sheet Fabrication		End-Use										
		Is This Customer a Related	End User (if Different from Customer)	Country of Sheet Fabrication		End-Use										
		Is This Customer a Related	End User (if Different from Customer)	Country of Sheet Fabrication		End-Use										
		Is This Customer a Related	End User (If Different from Customer)	Country of Sheet Fabrication		End-Use										
		Is This Customer a Related	End User (if Different from Customer)	Country of Sheet Fabrication		End-Use										
		Is This Customer a Related	End User (if Different from Customer)	Country of Sheet Fabrication		End-Use										
		Is This Customer a Related	End User (if Different from Customer)	Country of Sheet Fabrication		End-Use										
Customer	Customer Headquarters	Is This Customer a Related Party?	End User (if Different from Customer)	Country of Sheet Fabrication	Alloy	End-Use										
Customer		Is This Customer a Related Party?	End User (If Different from Customer)	Country of Sheet Fabrication	Alloy	End-Use										
Customer  r organization's total number	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  Begin to the second of			Alloy  Alloy  Titanium Tube (Kilograms)			/alue (\$USD)	Volume		Volume		Volume			2
Customer	Customer Headquarters	Is This Customer a Related Party?	End User (if Different from Customer)  End User (if Different from Customer)	Country of Sheet Fabrication  Country of Tube Fabrication	Alloy	End-Use End-Use	Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	D
Customer  r organization's total number	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  e. Where necessary, input 0.  Is This Customer a Related			Alloy  Alloy  Titanium Tube (Kilograms)		Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	D
Customer  or organization's total number	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  e. Where necessary, input 0.  Is This Customer a Related			Alloy  Alloy  Titanium Tube (Kilograms)		Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	D
Customer  ur organization's total numbr	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  e. Where necessary, input 0.  Is This Customer a Related			Alloy  Alloy  Titanium Tube (Kilograms)		Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	D
Customer  ur organization's total numbr	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  e. Where necessary, input 0.  Is This Customer a Related			Alloy  Alloy  Titanium Tube (Kilograms)		Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	e D
Customer  r organization's total number	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  e. Where necessary, input 0.  Is This Customer a Related			Alloy  Alloy  Titanium Tube (Kilograms)		Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	e D
Customer  or organization's total number	Customer Headquarters  er of customers for Titanium Tub	Is This Customer a Related Party?  e. Where necessary, input 0.  Is This Customer a Related			Alloy  Alloy  Titanium Tube (Kilograms)		Volume V	/alue (\$USD)	Volume 20	Value (\$USD)	Volume 2	Value (\$USD)	Volume	Value (\$USD)	Volume	e TD :

					Titanium (Other - Explain in Comments	A .									
ntify your organization's total nu	umber of customers for Titanium Finis input 0.	hed Goods. Where necessary,			manual (Gale) Explain in Commence	,									
		Is This Customer a Related					20	015	2	1016	2	2017	YTE	2018	YTD 2019
Customer	Customer Headquarters	Party?	End User (If Different from Customer)	Country of Other Titanium Fabrication	Comments	End-Use	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume	Value (\$USD)	Volume Valu (\$USI
1															
2															
4															
5															
6															
7															
9								-							
40															
10															
10					Titanium (Other - Explain in Comments	5)									
	mber of customers for Titanium (Oth						20	015	2	2016	2	2017	YTC	2018	YTD 2019
ntify your organization's total nu Customer	mber of customers for Titanium (Oth	er). Where necessary, input 0.  Is This Customer a Related Party?		Country of Other Titanium Fabrication	Titanium (Other - Explain in Comments  Comments	End-Use	Volume	015 Value (\$USD)	Volume	2016 Value (\$USD)	Volume	2017 Value (\$USD)		2018 Value (\$USD)	YTD 2019 Volume Valu (\$USI
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu
		Is This Customer a Related													Volume Valu

revious I			12. P					Next Pa
		prices in U.S. dollars your organization has solo your organization should be listed at fair mark		g products at pe	r kilogram over	the 2015-2019	period. Internal	consumption
		David List			,	/ear		
		Product	2015	2016	2017	2018	2018 YTD	2019 YTD
1		Standard Quality Sponge						
2		Aerospace Non-Rotating Sponge						
3		Rotating Grade Sponge						
4		Titanium Scrap						
			Tir	anium Ingot				
5	А	Titanium Ingot Containing Standard Quality Sponge						
3	В	Titanium Ingot Containing Aerospace Non- Roatating Sponge						
	с	Titanium Ingot Containing Rotating Grade Sponge						
			Ti	tanium Billet				
6	А	Titanium Billet Containing Standard Quality Sponge						
Ü	В	Titanium Billet Containing Aerospace Non- Rotating Sponge						
	С	Titanium Billlet Containing Rotating Grade Sponge						
7		Titanium Bar						
8		Titanium Plate						
9		Titanium Sheet						
10		Titanium Tube						
11		Other (Explain in Comments)						
12	Aer	ospace Structural Parts (e.g. spars, ribs)						
13	Aeros	pace High-impact Parts (e.g. landing gear)						
14	Aeros	pace External Engine Parts (e.g. cowl, fan)						
15	Aerospa	ace Internal Engine Parts (e.g. low pressure compressor)						
16	Land-E	Based Turbine Engine and Structural Parts						
17	Marit	time Turbine Engine and Structural Parts						
18	Cher	nical Processing Equipment (e.g. tubing)						
19	Titan	ium Satellite Components/Finished Parts						
20		Other (Explain in Comments)						
		Comments:						

Prev	vious Page_		12 Employment	Coorder Breakration				Next Page
	cate in the box to the right if your organization produced titanium sp		en 2015-2019. If yes, compl		d to the next page.		y/n	
Rec	ord the total number of full time equivalent (FTE) employees and conti	ractors for the 2015 to 2019						
Α	FTE Employees FTE Contractors		2015	2016	2017	2018	2019	
Reci	ord the total number of employees for each occupation type below for	2015 to 2019.						
	Occupation	2015	2016	2017	2018	2019	Comments	
	Chlorination			-				
	Sponge Mass Production							
	Electrolysis							
	Crushing/Shearing							
В	Inspection							
	Laboratory Testing							
	Blending/Packaging							
	Maintenance and Engineering							
	Administrative, Management, Legal Staff, IT Staff							
	Marketing and Sales							
	Other (specify here)							
Prov	vide the following information about employment difficulties, workford	ce age, educational requirem	ents, vacancies, and change	s in employment for the 2015 t	o 2019 period.			
	Occupation	Explanation for Difficulty, if Applicable	Current Average Age of Worker (2018)	Formal Education Requirements	On the Job Training Requirements (OTJ)	Current Number of Vacancies (2018)	Average Weeks Vacant	Explanation
	Chlorination							
	Sponge Mass Production							
	Electrolysis							
	Crushing/Shearing							
С	Inspection							
	Laboratory Testing							
	Blending/Packaging							
	Maintenance and Engineering							
	Administrative, Management, Legal Staff, IT Staff							
	Marketing and Sales							
	Other (specify here)							
D	Are the skills associated with the workforce in your organization transferable to other non-titanium industries?							
Е	If you resumed operations at an idled facility, do you reasonably anticipate being able to hire or rehire workers? What would the hiring timeline be?							
F	Does the geographic location of your organization's facilities play any role in the challenges in hiring, retaining, and rehiring employees?							
	Comments:							
		BUSINESS	CONFIDENTIAL - Per Section	n 705(d) of the Defense Produ	ction Act			

Prev	rious Page_			14 Employment Non S	oonge Titanium Production				Next Page
Rec	ord the total number of full time equivalent (FTE) employ	yees and contract	ors for the 2015 to 2019 per			on this page.			
				2015	2016	2017	2018	2019	
Α	FTE Employee FTE Contracto								
Rec	ord the total number of employees for each occupation t	type below for 20	15 to 2019.						
	Occupation		2015	2016	2017	2018	2019	Comments	
	Furnace/Melt Shop Operators								
	Grinders, Cutters, Forge Operators								
	Casters, Finishers								
	Machinists and Technicians								
В	Inspection and Quality Control								
	Other Production Staff								
	Maintenance, Engineering, and Chemical								
	Administrative, Management, Legal Staff, IT Staff								
	Marketing and Sales								
	Other (spe	ecify here)							
Prov	vide the following information about employment difficu	ulties, workforce a	ge, educational requiremen	ts, vacancies, and changes in	employment for the 2015 to 20	019 period.			
	Occupation		Explanation for Difficulty, if Applicable	Current Average Age of Worker (2018)	Formal Education Requirements	On the Job Training Requirements (OTJ)	Current Number of Vacancies (2018)	Average Weeks Vacant	Explanation
	Furnace/Melt Shop Operators								
	Grinders, Cutters, Forge Operators								
	Casters, Finishers								
	Machinists and Technicians								
С	Inspection and Quality Control								
	Other Production Staff								
	Maintenance, Engineering, and Chemical								
	Administrative, Management, Legal Staff, IT Staff								
	Marketing and Sales								
	Other (spe	ecify here)							
D	Does the industry experience any amount of workforce cross-over between commercial and U.S. government titanium activities?								
Е	Are the skills associated with the workforce in your organization transferable to other non-titanium industries?								
F	If you resumed operations at an idled facility, do you reasonably anticipate being able to hire or rehire workers? What would the hiring timeline be?								
G	Does the geographic location of your organization's facilities play any role in the challenges in hiring, retaining, and rehiring employees?								
	Comments:								
			BUSINES	S CONFIDENTIAL - Per Section	n 705(d) of the Defense Produc	ction Act			

Previous Page Next Page 15. Financials Provide the following financial line items for your organization's titanium-related cost center/business activity U.S. operations below for the 2015 to 2019 period. Only complete section B if your organization operated a sponge facility between 2015-2019. Source of Financial Data: Reporting Schedule: Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12 Income Statement (Select Line Items) A. 2015 2016 2017 2018 2019 (estimate) 1 Net Sales (and other revenue) 2 Cost of Goods Sold 3 Total Operating Income (Loss) 4 Earnings Before Interest and Taxes 5 Net Income Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12 В. Income Statement (Select Sponge Line Items) 2015 2016 2017 2018 2019 (estimate) 1 Sponge Net Sales 2 Cost of Sponge Sold 3 Sponge Total Operating Income (Loss) 4 Sponge Earnings Before Interest and Taxes 5 Sponge Net Income Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12 Balance Sheet (Select Line Items) C. 2015 2016 2017 2018 2019 (estimate) 1 Cash 2 Inventories 3 Total Current Assets 4 Total Assets 5 Total Current Liabilities 6 Total Liabilities 7 Retained Earnings 8 Total Owner's Equity Comments: BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Prev	ious P	lage								Next Page
				16. Sa	les					
	From	n 2015 to 2019, record your organization's total sales data for all titar	nium products, including s	ponge.						
		ne 1, indicate your total sales (including commercial and government	•							
		ne 2, indicate what percent of your total sales which were non-U.S. sa	•		•	of the U.S.)				
		ne 3, indicate what percent of your total sales (Line A) that were U.S.	, ,	, ,	overnment)					
		ne 4, indicate what percent of your total sales (Line A) that were NAT ne 5, indicate what percent of your total sales (Line A) that were Majo	· · · · · · · · · · · · · · · · · · ·							
		es 5, indicate what percent of your total sales (tine A) that were Majo es: "Non-U.S." means export sales from U.S. locations.	or Non-NATO Ally military	-related						
	Note	Non o.s. means export sales from o.s. locations.	I					<i>'</i>		
					<corpo< td=""><td>rate/Whole Or</td><td>ganization, Divisio</td><td>n/Business l</td><td>Jnit&gt;</td><td></td></corpo<>	rate/Whole Or	ganization, Divisio	n/Business l	Jnit>	
		Sales				<calend< td=""><td>ar Year/Fiscal Yea</td><td>r&gt;</td><td></td><td></td></calend<>	ar Year/Fiscal Yea	r>		
Α.					Record i	in \$ Thousands	e.g. \$12,000.00 =	survey inpu	ıt \$12	
Α.			2015		2016		2017		2018	2019 YTD
	1	Total Sales, all domestic and foreign customers								
	Lines	2-5 need not sum to 100%. Estimates are acceptable.		•					•	
	2	Total non-U.S. Sales (as a % of A)	%		%		%		%	%
	3	Total U.S. Defense Related Sales (as a % of A)	%		%		%		%	%
	4	Total NATO (Non-U.S.) Military Sales (as a % of A)	%		%		%		%	%
	5	Total Major Non-NATO Ally Military Sales (as a % of A)	%		%		%		%	%
	Expla	ain any irregularities with the sales data:								
		Comments:								
			<b>BUSINESS CONFIDENTIA</b>	L - Per Section	705(d) of the Defe	ense Productio	n Act	•		•

Prev	Previous Page Next Page										
	17. Research & Development and Capital Expenditures										
A.	A. Has your organization conducted titanium sponge, titanium melt, or titanium fabrication related research and development (R&D) from 2015-2019?  If no, proceed to Section D below.										
Rec	ord y	our organization's total R&D dollar expenditures and type of R&D expenditure for the	e 2015 to 2019 period.								
		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12									
			20:	15		016	2017	2018	2019		
	1	Total R&D Expenditures									
В.	2	Basic Research [as a % of B1]									
٥.	3	Applied Research [as a % of B1]									
	4	Product/Process Development [as a % of B1]									
	5	Total of 2 - 4 [must equal 100%]	0%		0%		0%	0%	0%		
	6	Titanium sponge and/or titanium melting and/or titanium fabrication -related R&D [ as a % of B1]									
		From 2015-2019, were your investments in R&D related to titanium sponge and/or to	ments in R&D related to titanium sponge and/or titanium melting and/or titanium fabrication diminished by financial constraints?								
C.	1	If yes, identify the reasons for these constraints:	se								
Rec	ord y	our organization's titanium sponge, titanium melting, and titanium fabrication relate	d capital expenditures	corresponding to th	e select categories	below for the 2015	-2019 period.	Below, provide any addition			
capital expenditures made in the past 5 years (2015  Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12								in the past 5 years (2015-2015).			
Capital Expenditure Activity Type			2015	2016	2017	2018	2019				
[	).	Total Capital Expenditures									
	1 Machinery, Equipment, and Vehicles [ as a % of D]										
	2	IT, Computers, Software [as a % of D]									
- :	3	Land, Buildings, and Leasehold Improvements [as a % of D]									
	4	Other (Specify) [as a % of D]						1			
-	5	Other (Specify) [as a % of D]									
Line	s 1 t	nrough 5 must total 100%	0%	0%	0%	0%	0%				
	exp	the below categories, indicate whether your organization experienced significant cha enditures over the past ten years (20010-2019). Explain what factors have been affec ernment or state government policies or regulations, domestic and foreign competit	ting changes in your o	rganization's capital							
E.			Yes/No If Yes, Type of Change		Explain						
	1	Machinery, Equipment, and Vehicles	y/n					1			
	2	IT, Computers, Software						1			
		Land, Buildings, and Leasehold Improvements						1			
	4 Other (Specify)							1			
		Other (Specify)						1			
Comments:											
	BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act										
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Pre	viou:	s Page			18. Competition and D	emand Trends		Next Page		
	18. Competition and Demand Trends  From 2009 to 2019, indicate whether import competition has affected your U.S. titanium related operations, sales, employment, planned expansions, etc. with respect to the production of any type of titanium. Indicate Yes/No to the right and explain below.									
		Item  Manufacturing Operations		Yes/No		Explain				
	1									
Α	2	Sales								
	3	Employment								
	-	Planned Expa								
	5	Other:	111310113							
	Doe	es your organia	Zation anticipate any negative eff Indicate Yes/No to the right and			s of titanium spon	ge and finis	shed products into the United States from the listed		
		Item		Sponge	Explain		Finished Products	Explain		
	1	Russia		y/n			y/n			
	2	Kazakhstan								
В	3	China								
		Japan								
	5	Ukraine								
	7	India Saudi Arabia			-		<b> </b>			
	8	Other:								
	9	Other:								
	10	Other:								
		your organization aware of any government assistance and/or non-market support given to sponge producers in the following countries? Indicate Yes/No to the right and plain below.								
			Item	Yes/No			Exp	lain		
		Russia								
С	2	Kazakhstan								
		China Japan		_						
		Ukraine								
		India								
	7	Saudi Arabia								
		If there were	no U.S. facilities producing							
	1	impacted? Ex								
D	2	protect busin	as your organization taken to less if in a hypothetical situation longe were unavailable? Explain.							
	3	Has your orga shortage or c imports? Exp	anization ever experienced a omplete cut off of sponge lain.							
		Describe the	top five most significant challeng	es to the cor	mpetitive position of your or	ganization in the U	J.S. titaniun	n market.		
		1								
		2								
	1	3								
		4								
		5								
Е		Describe the	top five most significant challeng	es to the cor	mpetitive position of your or	ganization in the n	on-U.S. tita	anium market.		
		1		-						
		2								
	2	3								
		5								
	Co	mments:								
			BU	SINESS CON	FIDENTIAL - Per Section 705	(d) of the Defense	Production	n Act		

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19. Certification				
	herein supplied in response to this questionnaire is complete and correct to the best of his/her			
-	make 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.	2. 1001 (1984 & SUPP. 1197)).			
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 comm	nents or any other information you wish to include regarding this survey assessment.			
How many hours did it take to complete this su	urvey?			
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