DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3229
FT. BELVOIR, VIRGINIA 22060-6223

IN REPLY
REFER TO DNSC-C **October 20, 2005**

AMENDMENT NO. 006
TO BASIC ORDERING AGREEMENT FOR
TANTALUM MATERIALS
UNDER DLA-TANTALUM-001

The above referenced Basic Ordering Agreement for the sale of tantalum materials is hereby amended as follows:

1. Amendments No. 002, 003, 004 and 005 are hereby deleted in their entirety.

2. All references to Category 2 (Tantalum/Columbium Concentrates), and/or radioactive material and any requirment for an NRC license for the transport of these materials are hereby deleted from the solicitation in their entirety, including previous amendments to the solicitation. The Defense National Stockpile Center no longer possesses any Tantalum/Columbium Concentrates material that is categorized as radioactive (>0.05% Thorium and Uranium content). The Tantalum/Columbium Concentrates in the DNSC inventory are Category 1 (<0.05% Thorium and Uranium Content).

3. SECTION C-QUOTES, subsection **C.1 Submission of Quotes (JUL 03), paragraph h.** is deleted in its entirety and replaced with the following:

> **h.** Quotes must be received by 11:30 AM, local time, Ft. Belvoir, Virginia, on the **Wednesday** following the posting of material. Quotes shall remain valid until two business days after the time set for receipt of quotes.

4. SECTION C-QUOTES, subsection **C.2 Web Site Information (JAN 02), paragraph b.** and **c.** are deleted in their entirety and replaced with the following:

> **b**. Quoters experiencing problems accessing the web site should contact the following:
>
> K. Watt Lough (703) 767-5402
> Jennifer Iribarren (703) 767-5487
> DNSC Contracting (703) 767-6500
>
> **c**. Quoters needing additional information on sales for any given day should contact one of the numbers listed in **paragraph b.** (above) for the Contracting Officer identified:
>
> Jennifer Iribarren

5. Section **D-PAYMENT (FEB 98)** is hereby deleted in its entirety and replaced with the following:

SECTION D-PAYMENT

D.1 Payment (OCT 05)

a. Payment shall be made in U.S. dollars.

b. Payment ***for material*** shall be made ***only*** by wire transfer (Fedwire). Payment for ***adjustments for variations in quantity or weight of material shipped***, storage charges, interest, penalty

charges, or administrative charges may be made by wire transfer, electronic funds transfer, or company or bank check. If payments for material (other than payments for adjustments for variations in quantity or weight) are made by electronic funds transfer or check, delays in shipment will result, and the payment may be returned to the sender.

c. Payment by wire transfer (Fedwire).

(1) Wire transfer payment shall be made in accordance with instructions in **Section J.3** Fees for wire transfers are the responsibility of the Contractor. Payment shall be accompanied by **identifying information including the contract number, invoice number (if applicable), and a description of the material purchased**.

(2) If wire transfer payment is not made in accordance with the instructions in **Section J.3** or if identifying information is not provided, shipment of material may be delayed by up to one week, the wire transfer may be returned to the sender or a Contractor may incur charges if payments are delinquent.

d. Payment by electronic funds transfer.

(1) Electronic funds transfer payment shall be made in accordance with instructions in **Section J.3**. Any fees for electronic funds transfers are the responsibility of the Contractor. Payment shall be accompanied by **identifying information including the contract number, invoice number, and a description of the material purchased**.

(2) If payment by electronic funds transfer is not made in accordance with the instructions in **Section J.3**, or if identifying information is not provided, payment may be returned to the sender and the Contractor may incur charges if payments are delinquent.

e. Payment by company or bank check.

(1) All checks must be drawn on a U.S. domestic bank or on the United States branch of an acceptable foreign bank and must be payable in United States currency. **A service charge of $100.00 will be applied to all returned checks.**

(2) Payment shall be made to the **Defense Finance and Accounting Service - Columbus (DFAS-Columbus)**. If a check is not made payable to DFAS-Columbus, the check may be returned and the $100.00 fee stated in **D.1.e.(1)** charged. Payment shall be accompanied by **identifying information including the contract number, invoice number, and a description of the material purchased**. Check payments which do not have the required identification may be returned and the Contractor may incur charges if payments are delinquent. Check payments shall be sent to:

ATTN: DNSC-R, Accounts Receivable
Defense National Stockpile Center
8725 John J. Kingman Road Suite 3229
Fort Belvoir, VA 22060-6223

f. Invoices issued for adjustments for variations in quantity or weight, storage charges, interest, penalty charges, or administrative charges shall be paid promptly.

g. If payment is not made in full within 30 calendar days of issuance of an invoice as specified in **D.1.f.**, the Contractor will be considered delinquent and any outstanding charges will be reduced

by any subsequent payments. No material will be released until all delinquent charges are paid. (See Sections **F.1.a.** and **G.11**.)

D.2 Payment Due Date (OCT 05)

a. Payment due dates will be applied as follows:

(1) If payment terms are not extended, payment will be made before shipment of material and before the end of the contract period specified in the executed **Section I.1 Quote/Award Form (FEB 03).**

(2) If payment terms are approved, the Contractor shall pay the Government the full amount of **each** shipment no later than **30** calendar days after DNSC receives current, accurate and complete Shipping Instructions. Shipping Instructions must be submitted on or before the final day of the contract period. Notwithstanding any other provision of the contract, payment is due with or without the issuance of an invoice by the Government. If the Contractor fails to make payment timely, the Contractor will be considered delinquent (see Section **D.1.g.**, **F.1.a.**, and **G.11**), and the Government, at its sole discretion, may revoke payment terms and take other appropriate action in accordance with Section **G.8**. If the Contractor fails to submit current, accurate and complete Shipping Instructions on or before the final day of the contract period, the Government will revoke payment terms and payment must be made ***before*** shipment of material.

b. If payment is not received by 2:00 p.m., local time Fort Belvoir, VA, on the payment due date, payment will not be credited until the next Government business day. Interest and penalty charges will accrue accordingly.

c. In the event the payment due date falls on a Saturday, Sunday, or holiday, then the payment due date will be extended to the next Government business day.

D.3 Interest (MAY 04)

a. All amounts that become payable by the Contractor to the Government under this contract shall bear simple interest from the date due until paid. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in 41 U.S.C. 611, which is applicable to the period in which the amount becomes due, as provided in paragraph **b.**, below.

b. Amounts shall be due at the earliest of the following dates:

(1) The final day of the contract period specified in Section **I.1 Quote/Award (FEB 03)**(with or without the issuance of an invoice by the Government);

(2) The date of the first written demand for payment under the contract, including any demand resulting from a default termination, unless paid within 30 days of becoming due; or

(3) If payment terms have been approved, **30** calendar days after the date that DNSC receives current, accurate and complete Shipping Instructions provided that Shipping Instructions are submitted on or before the final day of the contract period. If Shipping Instructions are not submitted on or before the final day of the contract period, amounts shall be due in accordance with the provisions of Section **D.3.b.(1)**.

D.4 Penalty and Administrative Charges (MAY 04)

In addition to interest charges specified in Section **D.3**, above, a penalty charge of 6 percent per annum shall be assessed on any debt principal that is delinquent more than 90 calendar days. Penalty charges shall accrue from the date the principal amount due becomes delinquent until paid. Additional administrative charges may be assessed, if needed. Administrative charges relate only to delinquent debts and will be assessed to cover expenses incurred by the Government in the recovery of such debts.

6. Section **G.11 Setoff of Funds (JUL 98)** is hereby deleted in its entirety and replaced with the following:

G.11 Setoff of Funds (OCT 05)

The Contractor agrees that the Government may use all or a portion of any monies received by the Government to satisfy, in whole or in part, any debt (e.g., delinquent payments, interest, penalty charges, administrative charges, or storage charges), arising out of this or any other transaction.

7. SECTION F-SHIPPING, subsection **F.1 Request for Shipment (JAN 02), paragraph f.** is hereby modified to add a new facsimile number to which Shipping Instructions can be submitted. The new facsimile number for the Tantalum/Columbium Contract Specialist, K. Watt Lough, is (703) 767-5411. Please use this number if faxing Shipping Instructions to the Contract Specialist.

8. SECTION I-SUBMITTALS, subsection **I.2 Shopping List (MAY 03)** is hereby deleted in its entirety and replaced with the attached **I.2 Shopping List (OCT 05).**

9. SECTION J-LIST OF ATTACHMENTS, subsection **J.1 Tantalum Analyses (MAY 03)** is hereby deleted in its entirety and replaced with the attached **J.1 Tantalum Analyses (OCT 05)** and **J.1.a. Columbium Analyses (OCT 05).**

10. SECTION J-LIST OF ATTACHMENTS, subsection **J.2 Storage Locations (MAY 03)** is herby deleted in its entirety and replaced with the attached **J.2 Storage Locations (OCT 05).**

11. SECTION J-LIST OF ATTACHMENTS, subsection **J.4 Material Safety Data Sheets (OCT 02)** is hereby deleted in its entirety and replaced with the attached **J.4 Material Safety Data Sheets.**

12. Section **J.5 Fedwire Procedures (JAN 95)** is hereby deleted in its entirety and replaced with the attahced **J.5 FEDWIRE AND ELECTRONIC FUNDS TRANSFER PROCEDURES (OCT 05).**

13. For transportation within the United Sates on or after September 25, 2003 a Contractor must use a carrier that has an “en route security plan” conforming to the requirements of 49 CFR 172.802 for all of the following Tantalum Materials:

Tantalum Metal Capacitor Grade (Grades 1, 1A, 2, 3, 4 and 5).

14. Quoters shall acknowledge receipt of this Amendment by signing in the space provided below and returning this form to:

Attn: Tantalum/Columbium Contract Specialist, DNSC-C
Defense National Stockpile Center (DNSC)
8725 John J. Kingman Road, STE 3229
Fort Belvoir, VA 22060-6223
Facsimile No. (703) 767-5411

Failure to acknowledge receipt of the Amendment may result in the Quoter being ineligible to Quote. Except as provided herein, all other terms and conditions of DLA-TANTALUM-001 with Amendment No. 001 remain unchanged and in full force and effect except as herein amended.

NAME OF FIRM: _____

ADDRESS: _____

TELEPHONE: _____ **FACSIMILE:** _____

COMPLETED BY: _____

SIGNATURE: _____ **DATE:** _____

TITLE: _____

WEB PAGE: _____ **E-MAIL ADDRESS:** _____

Access to Basic Ordering Agreement DLA-TANTALUM-001, Amendment No. 001 and this amendment is available at the DNSC Website: **https://www.dnsc.dla.mil**

Section I.2
Shopping List (OCT 05)

Tantalum/Columbium Materials

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I.2 Shopping List (OCT 05)
A. Columbium Metal Ingots

NO.	LOCATION	NUMBER	NO. OF Cradles	PRODUCER	Quantity Columbium (Cb) Net Wt. (LBS.)	Quantity Per LB Cb
45	Binghamton, NY	NB 73060-1	2	DOMESTIC CABOT CORP.	2,491.0000	2,489.7545
46	Binghamton, NY	NB 73062-1	2	DOMESTIC CABOT CORP.	2,473.0000	2,470.7743
47	Binghamton, NY	NB 73063-1	2	DOMESTIC CABOT CORP.	2,422.0000	2,420.7890
48	Binghamton, NY	NB 73064-1	2	DOMESTIC CABOT CORP.	2,421.0000	2,419.7895
49	Binghamton, NY	NB 73067-1	2	DOMESTIC CABOT CORP.	2,474.0000	2,473.0104
55	Binghamton, NY	NB 73077-1	2	DOMESTIC CABOT CORP.	2,509.0000	2,508.2473
57	Binghamton, NY	NB 73079-1	2	DOMESTIC CABOT CORP.	2,501.0000	2,500.2497
58	Binghamton, NY	NB 73081-1	2	DOMESTIC CABOT CORP.	2,508.0000	2,507.2476
59	Binghamton, NY	NB 73086-2	2	DOMESTIC CABOT CORP.	2,323.0000	2,321.6062
60	Binghamton, NY	NB 73119-3	2	DOMESTIC CABOT CORP.	2,574.0000	2,572.1982
66	Binghamton, NY	NB 83947-2	2	DOMESTIC CABOT CORP.	2,540.0000	2,538.2220
70	Binghamton, NY	NB 83955-2	2	DOMESTIC CABOT CORP.	2,416.0000	2,413.8256
				DOMESTIC **SUBTOTAL**	**29,652.0000**	**29,635.7143**

Minimum Offer Quantity - One Line Item

Offer Price Must be in Pounds (LB) Contained Columbium (Cb)

(There are 2 Ingot Pieces Per Cradle Per Lot)

I.2 Shopping List (OCT 04)
A. Columbium Metal Ingots

NO.	LOCATION	NUMBER	NO. OF Cradles	PRODUCER	Quantity Columbium (Cb) Net Wt. (LBS.)	Quantity Per LB Cb
71	Binghamton, NY	NB 83956-2	2	CABOT CORP. DOMESTIC	2,450.0000	2,447.7950
72	Binghamton, NY	NB 83957-2	2	CABOT CORP. DOMESTIC	2,455.0000	2,452.5450
73	Binghamton, NY	NB 83961-2	2	CABOT CORP. DOMESTIC	2,542.0000	2,539.7122
74	Binghamton, NY	NB 83962-2	2	CABOT CORP. DOMESTIC	2,425.0000	2,422.5750
75	Binghamton, NY	NB 83963-2	2	CABOT CORP. DOMESTIC	2,450.0000	2,447.7950
				SUBTOTAL	**12,322.0000**	**12,310.4222**
				Depot Total	**41,974.0000**	**41,946.1365**

Minimum Offer Quantity - One Line Item

Offer Price Must be in Pounds (LB) Contained Columbium (Cb)

(There are 2 Ingot Pieces Per Cradle Per Lot)

ITEM NO.	STORAGE LOCATION	ORIGIN	LOT NO.	NO. UNITS	BULK WT.(LBS.)	Ta_2O_5 WEIGHT
	Category 1	Tantalum/Columbium Concentrates Less Than 0.05% Combined Thorium and Uranium				
124	Warren, OH	BELGIAN CONGO	92C	08	2,748.0000	904.6416
125	Warren, OH	BELGIAN CONGO	115B	08	2,373.0000	895.0956
126	Warren, OH	BELGIAN CONGO	81HOB	05	1,691.0000	1,083.5928
127	Warren, OH	BELGIAN CONGO	88HOB	31	10,784.0000	4,783.7824
128	Warren, OH	BELGIAN CONGO	19H	08	2,843.0000	1,849.0872
129	Warren, OH	BELGIAN CONGO	20H	13	4,602.0000	3,127.5192
130	Warren, OH	BELGIAN CONGO	65H	10	3,232.0000	1,552.0064
131	Warren, OH	BELGIAN CONGO	68H	08	2,665.0000	1,702.4020
132	Warren, OH	BELGIAN CONGO	71H	05	1,614.0000	1,078.9590
133	Warren, OH	BELGIAN CONGO	77H	05	1,795.0000	1,203.0090
134	Warren, OH	BELGIAN CONGO	94H	04	1,421.0000	923.3658
135	Warren, OH	BELGIAN CONGO	95H	06	2,165.0000	970.1365
				SUBTOTAL	37,933.0000	20,073.5975

ITEM NO.	STORAGE LOCATION	ORIGIN	LOT NO.	NO. UNITS	BULK WT.(LBS.)	Ta_2O_5 WEIGHT
	Category 1	Tantalum/Columbium Concentrates Less Than 0.05% Combined Thorium and Uranium				
136	Warren, OH	BELGIAN CONGO	72HB	007	2,340.0000	1,218.6720
137	Warren, OH	BELGIAN CONGO	104	013	4,376.0000	1,989.3296
138	Warren, OH	BELGIAN CONGO	110	008	2,215.0000	1,072.5030
139	Warren, OH	BELGIAN CONGO	111	021	7,369.0000	4,056.6345
140	Warren, OH	BELGIAN CONGO	127	009	2,839.0000	1,386.5676
141	Warren, OH	BELGIAN CONGO	177	021	7,280.0000	3,466.7360
142	Warren, OH	BELGIAN CONGO	190	013	4,072.0000	1,792.4944
144	Warren, OH	UNKNOWN	27001	128	89,599.0000	24,845.8027
145	Warren, OH	UNKNOWN	27002	128	89,577.0000	26,649.1575
146	Warren, OH	UNKNOWN	27003	128	89,599.0000	26,091.2288
147	Warren, OH	UNKNOWN	27004	128	89,599.0000	26,521.3040
148	Warren, OH	UNKNOWN	27005	128	89,599.0000	27,058.8980
149	Warren, OH	UNKNOWN	27006	128	89,599.0000	29,083.8354
150	Warren, OH	UNKNOWN	27015	128	89,599.0000	26,637.7827
151	Warren, OH	UNKNOWN	27017	128	89,599.0000	26,754.2614
152	Warren, OH	UNKNOWN	27019	128	89,599.0000	27,721.9306
153	Warren, OH	UNKNOWN	27021	136	95,199.0000	28,864.3368
154	Warren, OH	UNKNOWN	27022	136	95,199.0000	28,940.4960
				SUBTOTAL	1,027,258.0000	314,151.9710

ITEM NO.	STORAGE LOCATION	ORIGIN	LOT NO.	NO. UNITS	BULK WT.(LBS.)	Ta205
	Category 1	Tantalum/Columbium Concentrates Less Than 0.05% Combined Thorium and Uranium				
473	Warren, OH	Unknown	120	128	89,599.0000	26,386.9055
474	Warren, OH	Unknown	121	128	89,599.0000	27,838.4093
475	Warren, OH	Unknown	122	128	89,599.0000	26,637.7827
476	Warren, OH	Unknown	126	128	89,599.0000	26,664.6624
477	Warren, OH	Unknown	127	128	89,599.0000	26,019.5496
478	Warren, OH	Unknown	128	128	89,599.0000	25,894.1110
479	Warren, OH	Unknown	129	128	89,599.0000	27,184.3366
480	Warren, OH	Unknown	130	128	89,599.0000	26,342.1060
				SUBTOTAL	716,792.0000	212,967.8631
		WARREN DEPOT TOTAL			1,781,983.0000	547,193.4316

ITEM NO.	STORAGE LOCATION	ORIGIN	LOT NO.	NO. UNITS	BULK WT.(LBS.)	Ta_2O_5 WEIGHT
	Category 1	Tantalum/Columbium Concentrates Less Than 0.05% Combined Thorium and Uranium				
385	NEW HAVEN	GERMAN	S-1048 (050)	100	9,195.5000	9,152.2812
386	NEW HAVEN	GERMAN	S-1048-NEW YORK	50	4,979.5000	4,949.6230
387	NEW HAVEN	GERMAN	S-1138G (351)	50	5,031.0000	5,017.9194
388	NEW HAVEN	GERMAN	S-1138F (401)	60	6,019.5000	6,003.2474
389	NEW HAVEN	GERMAN	S-992-2	50	5,006.5000	4,989.4779
390	NEW HAVEN	GERMAN	S-992-3	50	5,003.5000	4,983.4860
391	NEW HAVEN	GERMAN	P-902-1	50	5,011.5000	4,994.4609
392	NEW HAVEN	GERMAN	P-902-2	50	5,013.5000	4,991.9420
393	NEW HAVEN	GERMAN	S-1138-1	50	5,019.5000	5,006.9512
394	NEW HAVEN	GERMAN	S-1138-2	50	5,003.5000	4,987.9892
395	NEW HAVEN	GERMAN	S-1138-3	50	5,019.5000	5,002.4337
396	NEW HAVEN	GERMAN	S-1138-4	50	10,004.5000	9,983.4906
397	NEW HAVEN	GERMAN	S-1138-5	100	10,016.5000	9,998.4703
398	NEW HAVEN	GERMAN	M New York-120	20	2,000.0000	1,985.0000
				SUBTOTAL	82,324.0000	82,046.7726
				New Haven Depot Total	82,324.0000	82,046.7726

ITEM NO.	STORAGE LOCATION	LOT	No. OF BOXES	PRODUCER	QUANTITY Tantalum Carbide Bulk Wt.(Lbs.)	QUANTITY Ta Contained Weight
18	Warren, OH	9	3	Kennametal	900.0000	843.3000
19	Warren, OH	10	3	Kennametal	900.0000	843.3900
20	New Haven, IN	2	3	Kennametal	900.0000	844.5600
21	New Haven, IN	2	4	Wah Chang	1,350.0000	1,270.3500
22	Somerville	17	3	Kennametal	800.0000	749.2000
23	Somerville	10	3	Wah Chang	900.0000	848.4300
24	Somerville	11	3	Wah Chang	900.0000	847.5300
25	Somerville	12	3	Kennametal	900.0000	848.4300
26	Somerville	8	3	Kennametal	900.0000	841.9500
27	Somerville	11	3	Kennametal	900.0000	844.5600
28	Somerville	12	3	Kennametal	900.0000	843.4800
29	Somerville	15	3	Kennametal	900.0000	843.4800
30	Somerville	16	3	Kennametal	900.0000	841.0500
31	Somerville	8	3	Wah Chang	900.0000	847.5300
	TOTAL		43		12,950.0000	12,157.2400

ITEM NO.	STORAGE LOCATION	LOT NO.	NUMBER OF. DRUMS/KEGS	QUANTITY BULK WT. (LBS.)	QUANTITY Ta_20_5	Ta Contained
3	New Haven, IN	3	82	25,009.5000	24,966.9839	20,447.2108
	TOTAL			25,009.5000	24,966.9839	20,447.2108

ITEM NO.	STORAGE LOCATION	Form/ Grade	LOT NUMBER	No. of Boxes	QUANTITY Tantalum (Ta) Net Wt. (lbs.)	QUANTITY Tantalum (Ta) Stockpile Wt. (lbs.)
			Grade 1			
481	Somerville, NJ	powder/High Cap NRV Gr. 1	111	4	480.0000	479.3194
484	Somerville, NJ	powder/High Cap NRV Gr. 1	114	4	480.0000	479.3126
486	Somerville, NJ	powder/High Cap NRV Gr. 1	133	4	480.0000	479.2891
487	Somerville, NJ	powder/High Cap NRV Gr. 1	134	4	480.0000	479.3962
488	Somerville, NJ	powder/High Cap NRV Gr. 1	135	4	480.0000	479.3280
490	Somerville, NJ	powder/High Cap NRV Gr. 1	137	4	480.0000	479.3290
			Total		2,880.0000	2,875.9743
			Grade 1A			
491	Warren, OH	powder/High Cap NRV Gr. 1A	207	7	740.0000	738.8900
492	Warren, OH	powder/High Cap NRV Gr. 1A	217	7	740.0000	739.8520
493	Warren, OH	powder/High Cap NRV Gr. 1A	218	6	720.0000	718.9200
494	Warren, OH	powder/High Cap NRV Gr. 1A	219	6	720.0000	718.9200
495	Warren, OH	powder/High Cap NRV Gr. 1A	224	6	720.0000	718.9920
496	Warren, OH	powder/High Cap NRV Gr. 1A	231	6	720.0000	718.9920
497	Warren, OH	powder/High Cap NRV Gr. 1A	240	6	620.0000	619.1940
498	Warren, OH	powder/High Cap NRV Gr. 1A	243	6	720.0000	719.0640
499	Warren, OH	powder/High Cap NRV Gr. 1A	244	6	720.0000	718.9920
500	Warren, OH	powder/High Cap NRV Gr. 1A	245	6	720.0000	718.9920
501	Warren, OH	powder/High Cap NRV Gr. 1A	246	6	720.0000	718.9920
502	Warren, OH	powder/High Cap NRV Gr. 1A	247	6	720.0000	718.9920
503	Warren, OH	powder/High Cap NRV Gr. 1A	255	2	200.0000	199.7200
			SUBTOTAL		8,780.0000	8,768.5120

ITEM NO.	STORAGE LOCATION	Form/ Grade	LOT NUMBER	No. of Boxes	QUANTITY Tantalum (Ta) Net Wt. (lbs.)	QUANTITY Tantalum (Ta) Stockpile Wt. (lbs.)
			Grade 1			
504	Warren, OH	powder/High Cap NRV Gr. 1	048	4	480.0000	479.3314
505	Warren, OH	powder/High Cap NRV Gr. 1	054	4	480.0000	479.3938
506	Warren, OH	powder/High Cap NRV Gr. 1	055	4	480.0000	479.3472
507	Warren, OH	powder/High Cap NRV Gr. 1	056	4	480.0000	479.3458
508	Warren, OH	powder/High Cap NRV Gr. 1	069	4	480.0000	479.3856
509	Warren, OH	powder/High Cap NRV Gr. 1	070	4	480.0000	479.3534
510	Warren, OH	powder/High Cap NRV Gr. 1A	071	4	480.0000	479.3534
511	Warren, OH	powder/High Cap NRV Gr. 1A	072	4	480.0000	479.2968
512	Warren, OH	powder/High Cap NRV Gr. 1A	073	4	480.0000	479.2934
513	Warren, OH	powder/High Cap NRV Gr. 1A	074	4	480.0000	479.3333
514	Warren, OH	powder/High Cap NRV Gr. 1A	075	4	480.0000	479.2987
515	Warren, OH	powder/High Cap NRV Gr. 1A	076	4	480.0000	479.3510
516	Warren, OH	powder/High Cap NRV Gr. 1A	077	4	480.0000	479.3002
517	Warren, OH	powder/High Cap NRV Gr. 1A	078	4	480.0000	479.2954
518	Warren, OH	powder/High Cap NRV Gr. 1A	079	4	480.0000	479.3808
519	Warren, OH	powder/High Cap NRV Gr. 1A	080	4	480.0000	479.3750
520	Warren, OH	powder/High Cap NRV Gr. 1A	081	4	480.0000	479.3525
521	Warren, OH	powder/High Cap NRV Gr. 1A	099	4	480.0000	479.3386
522	Warren, OH	powder/High Cap NRV Gr. 1A	100	4	480.0000	479.3914
523	Warren, OH	powder/High Cap NRV Gr. 1A	101	4	480.0000	479.2987
524	Warren, OH	powder/High Cap NRV Gr. 1A	102	4	480.0000	479.3438
			TOTAL		10,080.0000	10,066.1602
			Grade 5			
525	Warren, OH	powder/Extra High Cap Gr. 5	516	5	560.0000	559.2160
526	Warren, OH	powder/Extra High Cap Gr. 5	517	4	410.0000	409.4260
527	Warren, OH	powder/Extra High Cap Gr. 5	518	4	430.0000	429.3550
			TOTAL		1,400.0000	1,397.9970

Section J.1
Tantalum Analyses
(OCT 05)

Tantalum/Columbium Materials

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J.1 Chemical Analysis of Niobium (Columbium) Metal Ingots - Vacuum Grade

Storage Location: Warren, OH

Item No.	Lot/Ingot No.	(Nb%)	(O)	(N)	(C)	(S)	(P)	(Si)	(Zr)	(Al)	(Sb)	(As)	(Bi)	(B)	(Co)	(Pb)	(Ti)	(Mo)	(W)	(V)	(Ta)	(Mn)	(Zn)	(Ni)	(Fe)	(Cu)	(Cr)	(Ca)	(H)	(Mg)	(Se)	(Ag)	(Te)	(Tl)	(Sn)
45	NB 73060-1	99.9500	35	<10	30	<10	<5	50	<10	<5	5	5	<1	10	<5	<1	<5	15	<100	<5	295	<5	<25	<5	<5	<5	<5	<10	<5	<5	<1	1	<5	<5	<5
46	NB 73062-1	99.9100	40	15	50	<10	7	55	<10	15	5	4	<1	4	<5	1	10	20	<100	<5	670	10	<25	<5	10	<5	<5	<10	<5	<5	<1	2	<5	<5	<5
47	NB 73063-1	99.9500	50	15	20	<10	7	15	<10	25	<5	4	<1	5	<5	<1	10	70	<100	<5	200	20	<25	10	10	<5	<5	<10	<5	<5	<1	1	<5	<5	<5
48	NB 73064-1	99.9500	40	20	20	<10	49	62	<10	10	<5	4	<1	2	<5	<1	<5	25	<100	<5	165	<5	<25	<5	5	40	<5	<10	5	<5	<1	1	<5	<5	<5
49	NB 73067-1	99.9600	40	15	35	<10	<5	20	<10	15	5	4	<1	5	<5	1	<5	30	<100	<5	165	<5	<25	<5	15	10	<5	<10	<5	5	<1	1	<5	<5	<5
55	NB 73077-1	99.9700	80	25	30	<10	10	10	<10	25	5	<1	<1	3	<5	<1	<5	30	<100	<5	100	<5	<25	<5	10	<5	<5	<10	<5	<5	<1	<1	<5	<5	<5
57	NB 73079-1	99.9700	65	20	25	<10	15	15	<10	<5	5	5	<1	<1	<5	1	<5	10	<100	<5	130	<5	<25	<5	25	10	<5	<5	<5	<5	<1	1	<5	<5	<5
58	NB 73081-1	99.9700	50	20	10	<10	10	10	<10	<5	5	4	<1	<1	<5	1	<5	15	<100	<5	90	<5	<25	<5	<5	<5	<5	<10	10	<5	<1	1	<5	<5	<5
59	NB 73086-2	99.9400	30	15	25	<10	9	25	15	15	5	4	<1	5	<5	<1	<5	75	<100	<5	235	<5	<25	10	15	15	10	<10	10	<5	<1	1.00	<5	<5	<5
60	NB 73119-3	99.9300	55	<10	15	<10	<5	20	<10	15	5	5	<1	5	<5	<1	<5	<10	<100	<5	500	<5	<25	5	15	10	<5	<10	<5	5	<1	1.00	<5	<5	<5
66	NB 83947-2	99.9300	45	25	10	<10	22	10	<10	<5	<5	<5	<1	5	<5	<1	<5	50	<100	<5	535	<5	<25	<5	<5	<5	<5	<10	<5	<5	<1	1	<5	<5	<5
70	NB 83955-2	99.9100	15	<10	15	<10	5	15	<10	<5	<5	<5	<1	<1	<5	<1	<5	50	<100	<5	770	<5	<25	<5	10	<5	<5	<10	<5	<5	<1	5	<5	<5	<5
71	NB 83956-2	99.9100	15	15	15	<10	10	20	<10	10	<5	<5	<1	<1	<5	<1	<5	50	<100	<5	735	<5	<25	<5	10	<5	<5	<10	<5	<5	<1	5	<5	<5	<5
72	NB 83957-2	99.9000	25	15	15	<10	31	15	<10	20	<5	<5	<1	<1	<5	<1	<5	50	<100	<5	770	<5	<25	<5	5	10	<5	<10	<5	<5	<1	3	<5	<5	<5
73	NB 83961-2	99.9100	35	<10	15	<10	22	10	25	10	<5	<5	<1	1	<5	<1	<5	50	<100	<5	670	5	<25	<5	20	<5	<5	<10	<5	<5	<1	5	<5	<5	<5
74	NB 83962-2	99.9000	15	<10	15	<10	8	10	<10	5	5	<5	<1	<1	<5	<1	<5	50	100	<5	870	<5	<25	<5	<5	<5	<5	<10	<5	<5	<1	2	<5	<5	<5
75	NB 83963-2	99.9100	15	10	15	<10	18	20	40	10	<5	<5	<1	<1	<5	2	<5	50	<100	<5	700	<5	<25	<5	30	<5	<5	<10	<5	<5	<1	1	<5	<5	<5

NOTES:

Line Items 45 thru 75 are domestically produced by Cabot Corporation and all results are in parts per million *(PPM)*

The analysis results included in this Subsection J.1 are for *informational purposes only*. See Subsection A.4., paragraph b.

Item No.	Storage Location	Contract Number	Lot Number	No. of Units	Country of Origin	Ta_2O_5	Cb_2O_5	SnO_2	TiO_2	Sb	Th	U	[Th+U]	Bulk Weight (Pounds)	Cb (Pounds)	Ta (Pounds)	Ta_2O_5 (Pounds)	Cb_2O_5 (Pounds)
						Percent (%) by Weight												
	NOTE B: These items are Category 1 - Tantalum Minerals Less Than 0.05% Combined Thorium and Uranium																	
124	Warren, OH	GS-OOP-3904-SCM-86	92C	8	Belgian Congo	32.9200	43.82	0.93	0.91	<0.01	0.003	0.037	0.040	2,748.00	841.8	740.9	904.6416	1,204.2
125	Warren, OH	GS-OOP-647-SCM	115B	6	Belgian Congo	37.7200	37.78	1.10	0.62	<0.01	0.002	0.020	0.022	2,373.00	626.7	733.0	895.0956	896.5
126	Warren, OH	GS-OOP-3904-SCM-79	81HOB	5	Belgian Congo	64.0800	11.52	0.83	0.41	<0.01	0.001	0.012	0.013	1,691.00	136.2	887.4	1,083.5928	194.8
127	Warren, OH	GS-OOP-3904-SCM-84	88HOB	31	Belgian Congo	44.3600	33.84	0.38	0.98	<0.01	0.004	0.015	0.019	10,784.00	2,551.0	3,917.7	4,783.7824	3,649.3
128	Warren, OH	GS-OOP-3904-SCM-24	19H	8	Belgian Congo	65.0400	9.72	1.98	0.36	<0.01	<0.001	0.009	0.009	2,843.00	193.2	1,514.3	1,849.0872	276.3
129	Warren, OH	GS-OOP-3904-SCM-24	20H	13	Belgian Congo	67.9600	9.96	1.44	0.36	<0.01	<0.001	0.009	0.009	4,602.00	320.4	2,561.3	3,127.5192	458.4
130	Warren, OH	GS-OOP-3904-SCM-66	65H	10	Belgian Congo	48.0200	24.38	0.90	0.44	<0.01	0.002	0.037	0.039	3,232.00	550.8	1,271.0	1,552.0064	788.0
131	Warren, OH	GS-OOP-3904-SCM-66	68H	8	Belgian Congo	63.8800	11.30	1.02	0.40	<0.01	<0.001	0.012	0.012	2,665.00	210.5	1,394.2	1,702.4020	301.1
132	Warren, OH	GS-OOP-3904-SCM-70	71H	5	Belgian Congo	66.8500	10.74	0.96	0.38	<0.01	<0.001	0.012	0.012	1,614.00	121.2	883.6	1,078.9590	173.3
133	Warren, OH	GS-OOP-3904-SCM-73	77H	5	Belgian Congo	67.0200	12.16	1.00	0.54	<0.01	0.002	0.013	0.015	1,795.00	152.6	985.2	1,203.0090	218.3
134	Warren, OH	GS-OOP-3904-SCM-88	94H	4	Belgian Congo	64.9800	10.78	0.92	0.44	<0.01	0.001	0.010	0.011	1,421.00	107.1	756.2	923.3658	153.2
135	Warren, OH	GS-OOP-3904-88	95H	6	Belgian Congo	44.8100	32.28	0.46	2.16	<0.01	0.006	0.017	0.023	2,165.00	488.5	794.5	970.1365	698.9
136	Warren, OH	GS-OOP-3904-SCM-70	72HB	7	Belgian Congo	52.0800	22.48	0.90	0.43	<0.01	0.004	0.023	0.027	2,340.00	367.7	998.0	1,218.6720	526.0
137	Warren, OH	GS-OOP-10714-SCM	104	13	Belgian Congo	45.4600	34.67	1.00	0.14	<0.01	0.009	0.034	0.043	4,376.00	1,060.6	1,629.2	1,989.3296	1,517.2
138	Warren, OH	GS-OOP-10714-SCM	110	8	Belgian Congo	48.4200	26.03	0.97	1.34	<0.01	0.008	0.014	0.022	2,215.00	403.0	878.3	1,072.5030	576.6
139	Warren, OH	GS-OOP-10714-SCM	111	21	Belgian Congo	55.0500	24.04	0.84	0.37	<0.01	0.002	0.029	0.031	7,369.00	1,238.4	3,322.2	4,056.6345	1,771.5
140	Warren, OH	GS-OOP-10714-SCM	127	9	Belgian Congo	48.8400	31.00	0.16	1.28	<0.01	0.018	0.025	0.043	2,839.00	615.2	1,135.5	1,386.5676	880.1
141	Warren, OH	GS-OOP-10714-SCM	177	21	Belgian Congo	47.6200	30.94	0.73	0.88	<0.01	0.002	0.013	0.015	7,280.00	1,574.5	2,839.1	3,466.7360	2,252.4
142	Warren, OH	GS-OOP-10714-SCM	190	13	Belgian Congo	44.0200	33.50	0.14	2.53	<0.01	0.010	0.031	0.041	4,072.00	953.6	1,468.0	1,792.4944	1,364.1
144	Warren, OH	SCM-TS-22213-NSP-1	27001	128	Unknown	27.7300	26.18	0.06	5.61	<0.01	0.002	0.003	0.005	89,599.00	16,397.4	20,347.7	24,845.8027	23,457.0
145	Warren, OH	SCM-TS-22213-NSP-1	27002	128	Unknown	29.7500	26.26	0.11	6.42	<0.01	0.001	0.003	0.004	89,577.00	16,443.5	21,824.6	26,649.1575	23,522.9
146	Warren, OH	SCM-TS-22213-NSP-1	27003	128	Unknown	29.1200	26.86	0.08	6.00	<0.01	0.001	0.003	0.004	89,599.00	16,823.3	21,367.7	26,091.2288	24,066.3
147	Warren, OH	SCM-TS-22213-NSP-1	27004	128	Unknown	29.6000	26.92	0.10	6.19	<0.01	0.002	0.002	0.004	89,599.00	16,860.9	21,719.9	26,521.3040	24,120.1
148	Warren, OH	SCM-TS-22213-NSP-1	27005	128	Unknown	30.2000	27.26	0.12	6.15	<0.01	0.002	0.002	0.004	89,599.00	17,073.8	22,160.2	27,058.8980	24,424.7
149	Warren, OH	SCM-TS-22213-NSP-1	27006	128	Unknown	32.4600	28.15	0.11	5.98	<0.01	0.001	0.002	0.003	89,599.00	17,631.3	23,818.5	29,083.8354	25,222.1
150	Warren, OH	SCM-TS-22213-NSP-1	27015	128	Unknown	29.7300	27.36	0.10	6.54	<0.01	0.001	0.002	0.003	89,599.00	17,136.5	21,815.3	26,637.7827	24,514.3
151	Warren, OH	SCM-TS-22213-NSP-1	27017	128	Unknown	29.8600	27.90	0.12	6.40	<0.01	0.002	0.004	0.006	89,599.00	17,474.7	21,910.7	26,754.2614	24,998.1
152	Warren, OH	SCM-TS-22213-NSP-1	27019	128	Unknown	30.9400	28.80	0.10	6.30	<0.01	0.003	0.004	0.007	89,599.00	18,038.4	22,703.2	27,721.9306	25,804.5
153	Warren, OH	SCM-TS-22213-NSP-1	27021	136	Unknown	30.3200	27.62	0.12	6.52	<0.01	0.001	0.003	0.004	95,199.00	18,380.5	23,638.7	28,864.3368	26,294.0
154	Warren, OH	SCM-TS-22213-NSP-1	27022	136	Unknown	30.4000	27.28	0.10	6.60	<0.01	0.002	0.004	0.006	95,199.00	18,154.3	23,701.1	28,940.4960	25,970.3
														1,065,191.00	**202,927.4**	**1,268,118.4**	**334,225.5685**	**290,294.4**

NOTE A: The analysis results included in this Subsection J.1 are for *informational purposes only*. See Subsection A.4., paragraph b.
NOTE B: These items are Category 1 - Tantalum Minerals Less Than 0.05% Combined Thorium and Uranium
NOTE C: Activity is based on chemical analyses and 49 CFR 173.345 values for natural U and natural Th.

TANTALUM/COLUMBIUM CONCENTRATES ANALYSIS

Item No.	Storage Location	Contract Number	Lot Number	No. of Units	Country of Origin	Ta_2O_5	Cb_2O_5	SnO_2	TiO_2	Sb	Th	U	[Th+U]	Bulk Weight (Pounds)	Cb (Pounds)	Ta (Pounds)	Ta_2O_5 (Pounds)	Cb_2O_5 (Pounds)
						Percent (%) by Weight												
NOTE B: These items are Category 1 - Tantalum Minerals Less Than 0.05% Combined Thorium and Uranium																		
385	Warren, OH	GS-OOP-7061 (SCM) 2F	S-1048	100	Germany	99.5300	0.02	<0.01	0.07	<0.01	0.001	0.001	0.002	9,195.5000	1.3	7,495.4	9,152.2812	1.8
386	Warren, OH	GS-OOP-7061 (SCM) 1	S-1048- NY	50	Germany	99.4000	0.07	<0.01	0.12	<0.01	0.001	0.001	0.002	4,979.5000	2.4	4,053.5	4,949.6230	3.5
387	Warren, OH	GS-OOP-7248 (SCM) 8	S-1138G	50	Germany	99.7400	0.06	<0.01	0.11	<0.01	0.001	0.001	0.002	5,031.0000	2.1	4,109.5	5,017.9194	3.0
388	Warren, OH	GS-OOP-7248 (SCM) 7F	S-1138/F	60	Germany	99.7300	0.02	<0.01	0.10	<0.01	0.001	0.001	0.002	6,019.5000	0.8	4,916.4	6,003.2474	1.2
389	Warren, OH	GS-OOP-3883-2 (SCM)	S-992-2	50	Germany	99.6600	0.15	<0.01	0.12	<0.01	0.001	0.001	0.002	5,006.5000	5.2	4,086.2	4,989.4779	7.5
390	Warren, OH	GS-OOP-3883 (SCM) 3F	S-992-3	50	Germany	99.6000	0.09	<0.01	0.13	<0.01	0.001	0.001	0.002	5,003.5000	3.1	4,081.3	4,983.4860	4.5
391	Warren, OH	GS-OOP-3592 (SCM) 1	P-902-1	50	Germany	99.6600	0.15	<0.01	0.09	<0.01	0.001	0.001	0.002	5,011.5000	5.3	4,090.3	4,994.4609	7.5
392	Warren, OH	GS-OOP-3592 (SCM) 2F	P-902-2	50	Germany	99.5700	0.19	<0.01	0.15	<0.01	0.001	0.001	0.002	5,013.5000	6.7	4,088.2	4,991.9420	9.5
393	Warren, OH	GS-OOP-7248 (SCM) 1	S-1138-1	50	Unknown	99.7500	0.01	<0.01	0.13	<0.01	0.001	0.001	0.002	5,019.5000	0.4	4,100.5	5,006.9513	0.5
394	Warren, OH	GS-OOP-7248 (SCM) 2	S-1138-2	50	Unknown	99.6900	0.08	<0.01	0.14	<0.01	0.001	0.001	0.002	5,003.5000	2.8	4,085.0	4,987.9892	4.0
395	Warren, OH	GS-OOP-7248 (SCM) 3	S-1138-3	50	Unknown	99.6600	0.14	<0.01	0.11	<0.01	0.001	0.001	0.002	5,019.5000	4.9	4,096.8	5,002.4337	7.0
396	Warren, OH	GS-OOP-7248 (SCM) 4F	S-1138-4	100	Germany	99.7900	0.03	<0.01	0.08	<0.01	0.001	0.001	0.002	10,004.5000	2.1	8,176.1	9,983.4906	3.0
397	Warren, OH	GS-OOP-7248 (SCM) 5	S-1138-5	100	Germany	99.8200	0.03	<0.01	0.08	<0.01	0.001	0.001	0.002	10,016.5000	2.1	8,188.3	9,998.4703	3.0
398	Warren, OH	GS-OOP-3418 1F (SCM)	M NY-120	20	Germany	99.2500	0.16	<0.01	0.17	<0.01	0.002	0.001	0.003	2,000.0000	2.2	1,625.6	1,985.0000	3.2
														82,324.0000	**41.5**	**67,193.0**	**82,046.7726**	**59.3**

NOTE C: Activity is based on chemical analyses and 49 CFR 173.345 values for natural U and natural Th.

TANTALUM/COLUMBIUM CONCENTRATES ANALYSIS

Item	Storage	Contract	Lot	No. of	Country of

J.1 TANTALUM MINERALS ANALYSIS

Item No.	Storage Location	Lot Number	No. of Units	Country of Origin	Ta_2O_5	Cb_2O_5	SnO_2	TiO_2	Sb	Th	U	[Th+U]	Cb (Pounds)	Ta (Pounds)	Ta_2O_5 (Pounds)	Cb_2O_5 (Pounds)
					Percent (%) by Weight											
472	Warren, OH	119	128	Unknown	29.89	25.81	0.20	6.14	<0.01	0.002	0.002	0.004	16,165.7	21,932.7	26,781.1411	23,125.5
473	Warren, OH	120	128	Unknown	29.45	26.31	0.10	5.60	<0.01	0.003	0.001	0.004	16,478.8	21,609.8	26,386.9055	23,573.5
474	Warren, OH	121	128	Unknown	31.07	26.47	0.08	5.91	<0.01	0.001	0.003	0.004	16,579.0	22,798.5	27,838.4093	23,716.9
475	Warren, OH	122	128	Unknown	29.73	26.46	0.12	5.57	<0.01	<0.001	0.004	0.004	16,572.8	21,815.3	26,637.7827	23,707.9
476	Warren, OH	126	128	Unknown	29.76	26.55	0.08	6.52	<0.01	<0.001	0.002	0.002	16,629.1	21,837.3	26,664.6624	23,788.5
477	Warren, OH	127	128	Unknown	29.04	27.19	0.11	6.91	<0.01	0.001	0.002	0.003	17,030.0	21,309.0	26,019.5496	24,362.0
478	Warren, OH	128	128	Unknown	28.90	26.80	0.13	6.43	<0.01	0.002	0.001	0.003	16,785.7	21,206.2	25,894.1110	24,012.5
479	Warren, OH	129	128	Unknown	30.34	27.21	0.06	6.83	<0.01	<0.001	0.002	0.002	17,042.5	22,262.9	27,184.3366	24,379.9
480	Warren, OH	130	128	Unknown	29.40	25.76	0.10	6.56	<0.01	0.001	0.002	0.003	16,134.3	21,573.1	26,342.1060	23,080.7
													149,418.0	**196,344.8**	**239,749.0042**	**213,747.4**

NOTE A: The analysis results included in this Subsection J.1 are for *informational purpose only*. See Subsection A.2., paragraph b.
NOTE B: These items are Category 1 - Tantalum Minerals Less Than 0.05% Combined Thorium and Uranium

TANTALUM CARBIDE ANALYSIS

Item No.	STORAGE LOCATION	LOT NO.	PRODUCER	NO. OF BOXES	BULK WEIGHT (LBS.)	% BY WEIGHT Ta	Cb	Ca	Fe	Si	Ti	TOTAL CARBON	FREE CARBON
18	Warren, OH	9	Kennametal Domestic	3	900	93.7000	0.13	*	0.01	0.001	*	6.10	0.02
19	Warren, OH	10	Kennametal Domestic	3	900	93.7100	0.1	*	0.01	0.003	0.005	6.15	0.002
20	New Haven, IN	2	Kennametal Domestic	3	900	93.8400	0.1	<0.01	0.007	<0.005	<0.001	6.10	0.03
21	New Haven, IN	2	Wah Chang Domestic	4	1,350	94.1000	0.08	<0.01	0.04	<0.01	<0.01	6.11	0.07
22	Warren, OH	17	Kennametal Domestic	3	800	93.6500	0.15	*	0.01	0.005	*	6.17	0.03
23	Warren, OH	10	Wah Chang Domestic	2	900	94.2700	0.08	<0.01	0.07	<0.01	<0.01	6.22	0.09
24	Warren, OH	11	Wah Chang Domestic	2	900	94.1700	0.08	<0.01	0.05	<0.01	<0.01	6.18	0.10
25	Warren, OH	12	Wah Chang Domestic	2	900	94.2700	0.08	<0.01	0.05	<0.01	<0.01	6.23	0.09
26	Warren, OH	8	Kennametal Domestic	3	900	93.5500	0.15	0.10	0.02	*	0.001	6.17	0.02
27	Warren, OH	11	Kennametal Domestic	3	900	93.8400	0.01	<0.01	0.003	<0.001	<0.001	6.14	0.02
28	Warren, OH	12	Kennametal Domestic	3	900	93.7200	0.11	0.05	0.01	<0.001	<0.001	6.10	0.02
29	Warren, OH	15	Kennametal Domestic	3	900	93.7200	0.10	0.01	0.02	0.01	*	6.16	0.03
30	Warren, OH	16	Kennametal Domestic	3	900	93.4500	0.30	0.07	0.02	0.01	*	6.14	0.03
31	Warren, OH	8	Wah Chang Domestic	2	900	94.1700	0.08	<0.01	0.04	<0.01	<0.01	6.17	0.09
			TOTAL:	**39**	**12,950**								

NOTES: The analysis results included in the Subsection J.1 are for ***informational purposes only***. See Subsection A.4., paragraph b.

Item No.	Storage Location	No. of Drums	Quantity Tantalum Oxide Net Wt. (LBS)	Lot No.	% by WEIGHT Ta2O5	Cb	Al	Ca	C r	Fe	Mn	Mg	Mo	Ni	Si	Na	Sn	Ti	W	Zr	Th	U	Th+u	LOI
3	New Haven, IN	82	25,009.50	3	99.8300	<0.01	<0.002	<0.001	0.002	0.002	0.001	<0.001	<0.002	<0.002	<0.01	<0.001	<0.001	0.002	<0.005	<0.002	<0.01	<0.01	<0.02	0.09

Elements:

Ta205 Tantalum Pentoxide
Cb Columbium
Al Aluminum
Ca Calcium
Cr Chromium
Fe Iron
Mn Manganese
Mg Magnesium

Elements:

Mo Molybdenum
Ni Nickel
Si Silicon
Na Sodium
Sn Tin
Ti Titanium
W Tungsten
Zr Zirconium

Elements:

Th Thorium
U Uranium
Th+u Throium+Uranium
LOI Lost of Ignition
Sn Tin

NOTES The analysis results included in the Subsection J.1 are for ***informational purposes only***. See Subsection A.4., paragraph b.

Chemical Analysis of Tantalum Metal Capacitor Grade

ITEM NO.	STORAGE LOCATION	FORM/ GRADE	LOT NUMBER	NO. OF BOXES	PRODUCER	QUANTITY Tantalum (Ta) Net Wt. (lbs)	Tantalum Ta	QUANTITY Computed Tantalum (Ta)	Carbon C	Oxygen O	D.C. Leakage (DCL) microamperes/ microfarad-volt	Capacitance CAP microfarad-volt per gram	Dissipation Factor (DF) maximum per anode
		Grade 1A											
491	Warren, OH	powder/High Cap. NRV Gr. 1A	207	7	Fansteel Met	740.00	99.8500	738.890	*	*	0.0011	2145	16
492	Warren, OH	powder/High Cap. NRV Gr. 1A	217	7	Fansteel Met	740.00	99.9800	739.852	*	*	0.0080	2042	19
493	Warren, OH	powder/High Cap. NRV Gr. 1A	218	6	Fansteel Met	720.00	99.8500	718.920	*	*	0.0092	2210	17
494	Warren, OH	powder/High Cap. NRV Gr. 1A	219	6	Fansteel Met	720.00	99.8500	718.920	*	*	0.0010	2178	18
495	Warren, OH	powder/High Cap. NRV Gr. 1A	224	6	Fansteel Met	720.00	99.8600	718.992	*	*	0.0011	2175	15
496	Warren, OH	powder/High Cap. NRV Gr. 1A	231	6	Fansteel Met	720.00	99.8600	718.992	*	*	0.0010	2250	13
497	Warren, OH	powder/High Cap. NRV Gr. 1A	240	6	Fansteel Met	620.00	99.8700	619.194	*	*	0.0010	1810	21
498	Warren, OH	powder/High Cap. NRV Gr. 1A	243	6	Fansteel Met	720.00	99.8700	719.064	*	*	0.0090	2010	18
499	Warren, OH	powder/High Cap. NRV Gr. 1A	244	6	Fansteel Met	720.00	99.8600	718.992	*	*	0.0060	2010	13
500	Warren, OH	powder/High Cap. NRV Gr. 1A	245	6	Fansteel Met	720.00	99.8600	718.992	*	*	0.0080	2060	13
501	Warren, OH	powder/High Cap. NRV Gr. 1A	246	6	Fansteel Met	720.00	99.8600	718.992	*	*	0.0100	2080	13
502	Warren, OH	powder/High Cap. NRV Gr. 1A	247	6	Fansteel Met	720.00	99.8600	718.992	*	*	0.0085	1916	15
503	Warren, OH	powder/High Cap. NRV Gr. 1A	255	2	Fansteel Met.	200.00	99.8600	199.720	*	*	0.0013	1910	18
					Sub-Total	**8,780.00**		**8,768.51**					

NOTES *The chemical percentages are not available.
The analysis results included in the Subsection J.1 are for ***informational purpose only***. See Subsection A.4., paragraph b.

Chemical Analysis of Tantalum Metal Capacitor Grade

ITEM NO.	STORAGE LOCATION	FORM/ GRADE	LOT NUMBER	NO. OF BOXES	PRODUCER	QUANTITY Tantalum (Ta) Net Wt. (lbs)	Tantalum Ta	QUANTITY Computed Tantalum (Ta)	Carbon C	Oxygen O	D.C. Leakage (DCL) microamperes/	Capacitance CAP microfarad-volt	Dissipation Factor (DF) maximum
		Grade 1											
504	Warren, OH	powder/High Cap. NRV Gr. 1	048	4	Kennametal	480.00	99.8607	479.3314	0.007	0.01	0.0031	2250	9
505	Warren, OH	powder/High Cap. NRV Gr. 1	054	4	Kennametal	480.00	99.8737	479.3938	0.006	0.08	0.0023	2270	9
506	Warren, OH	powder/High Cap. NRV Gr. 1	055	4	Kennametal	480.00	99.8640	479.3472	0.005	0.09	0.0031	2390	9
507	Warren, OH	powder/High Cap. NRV Gr. 1	056	4	Kennametal	480.00	99.8637	479.3458	0.005	0.09	0.0039	2310	9
508	Warren, OH	powder/High Cap. NRV Gr. 1	069	4	Kennametal	480.00	99.8720	479.3856	0.006	0.08	0.0023	2320	7
509	Warren, OH	powder/High Cap. NRV Gr. 1	070	4	Kennametal	480.00	99.8653	479.3534	0.005	0.09	0.0025	2360	8
510	Warren, OH	powder/High Cap. NRV Gr. 1	071	4	Kennametal	480.00	99.8653	479.3534	0.006	0.09	0.0019	2480	7
511	Warren, OH	powder/High Cap. NRV Gr. 1	072	4	Kennametal	480.00	99.8535	479.2968	0.005	0.01	0.0021	2290	6
512	Warren, OH	powder/High Cap. NRV Gr. 1	073	4	Kennametal	480.00	99.8528	479.2934	0.007	0.01	0.0019	2230	8
513	Warren, OH	powder/High Cap. NRV Gr. 1	074	4	Kennametal	480.00	99.8611	479.3333	0.006	0.09	0.0014	2190	8
514	Warren, OH	powder/High Cap. NRV Gr. 1	075	4	Kennametal	480.00	99.8539	479.2987	0.007	0.01	0.0022	2380	8
515	Warren, OH	powder/High Cap. NRV Gr. 1	076	4	Kennametal	480.00	99.8648	479.3510	0.005	0.09	0.0013	1970	6
					Sub-Total	**5,760.00**		**5,752.084**					

NOTES *The chemical percentages are not available.
The analysis results included in the Subsection J.1 are for ***informational purpose only*** . See Subsection A.4., paragraph b.

Chemical Analysis of Tantalum Metal Capacitor Grade

ITEM NO.	STORAGE LOCATION	FORM/ GRADE	LOT NUMBER	NO. OF BOXES	PRODUCER	QUANTITY Tantalum (Ta) Net Wt. (lbs)	Tantalum Ta	QUANTITY Computed Tantalum (Ta)	Carbon C	Oxygen O	D.C. Leakage (DCL) microamperes/ microfarad-volt	Capacitance CAP microfarad-volt per gram	Dissipation Factor (DF) maximum per anode
		Grade 1											
516	Warren, OH	powder/High Cap. NRV Gr. 1	077	4	Kennametal	480.00	99.8542	479.3002	0.007	0.01	0.0018	2110	7
517	Warren, OH	powder/High Cap. NRV Gr. 1	078	4	Kennametal	480.00	99.8532	479.2954	0.007	0.01	0.0020	2170	7
518	Warren, OH	powder/High Cap. NRV Gr. 1	079	4	Kennametal	480.00	99.8710	479.3808	0.006	0.08	0.0015	2100	7
519	Warren, OH	powder/High Cap. NRV Gr. 1	080	4	Kennametal	480.00	99.8698	479.3750	0.007	0.08	0.0016	2280	8
520	Warren, OH	powder/High Cap. NRV Gr. 1	081	4	Kennametal	480.00	99.8651	479.3525	0.005	0.09	0.0016	2330	9
521	Warren, OH	powder/High Cap. NRV Gr. 1	099	4	Kennametal	480.00	99.8622	479.3386	0.007	0.09	0.0015	2060	7
522	Warren, OH	powder/High Cap. NRV Gr. 1	100	4	Kennametal	480.00	99.8732	479.3914	0.005	0.08	0.0022	2210	8
523	Warren, OH	powder/High Cap. NRV Gr. 1	101	4	Kennametal	480.00	99.8539	479.2987	0.006	0.01	0.0017	2230	7
524	Warren, OH	powder/High Cap. NRV Gr. 1	102	4	Kennametal	480.00	99.8633	479.3438	0.005	0.09	0.0012	2190	8
					Sub-Total	**4,320.00**		**4,314.076**					
		Grade 5											
525	Warren, OH	powder/ Extra High Cap/Gr. 5	516	5	Fansteel Met.	560.00	99.8600	559.216	*	*	0.0025	3694	14
526	Warren, OH	powder/ Extra High Cap/Gr. 5	517	4	Fansteel Met.	410.00	99.8600	409.426	*	*	0.0013	3622	14
527	Warren, OH	powder/ Extra High Cap/Gr. 5	518	4	Fansteel Met.	430.00	99.8500	429.355	*	*	0.0018	3585	12
					Sub-Total	**1,400.00**		**1,397.997**					
					Grand Total	**20,260.00**		**20,232.67**					

NOTES *The chemical percentages are not available.
The analysis results included in the Subsection J.1 are for ***informational purpose only***. See Subsection A.4., paragraph b.

J.2 Storage Locations (OCT 05)

Storage locations and hours of operation for tantalum material are:

Warren Depot
Pine Street Extension
Warren, OH 44482-9999
Attention: John (Jack) Pittano
Phone No: (330) 652-1456
Fax No: (330) 652-5167
Hours: 7:30 AM – 2:30 PM (M– F)
Accessibility: Truck

New Haven Depot
15411 Dawkins Road
New Haven, IN 46774-9644
Attention: John Olszewski
Phone No: (260) 749-9544
Fax No: (260) 749-8467
Hours: 7:30 AM – 3:00 PM (M –Th)
7:30 AM – 2:30 PM (F)
Accessibility: Truck

Scotia Depot
Route 5, Building No. 12
Scotia, NY 12302-9463
Attention: Dennis Wesolowski
Phone No: (518) 370-3347
Fax No: (518) 370-0323
Hours: 7:30 AM – 2:30 PM (M – F)
Accessibility: Truck

Somerville Depot
152 US Highway 206 S
Hillsborough, NJ 08844-4135
Attention: James Farley
Phone No: (908) 725-6400
Fax No: (908) 707-4350
Hours: 7:30 AM – 2:30 PM (M – F)
Accessibility: Truck

View the **I.2** Shopping List(s) for the applicable Storage Locations.

Operations Office:

Mr. Charles Harder
Defense National Stockpile Center
Operations and Logistics Division
8725 John J Kingman Road, Suite 3229
Fort Belvoir, VA 22060-6223
Tel: (703)-767-1163
FAX: (703)-767-7608

Section J.4
Material Safety Data Sheets

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J. 4 MATERIAL SAFETY DATA SHEETS

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD
SUITE 3339
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: TANTALUM

TRADE NAMES/SYNONYMS:
TANTALUM-181; TANTALUM POWDER; TA; DLA22420; RTECS WW5505000

CHEMICAL FAMILY: metal

CREATION DATE: Jul 01 1992
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TANTALUM
CAS NUMBER: 7440-25-7
EC NUMBER (EINECS): 231-135-5
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Odorless, gray to bluish, hard, malleable, ductile metal or black powder. When polished the metal may be silver white.
MAJOR HEALTH HAZARDS: No significant target effects reported.
PHYSICAL HAZARDS: Extremely flammable. May ignite spontaneously on exposure to air. Dust/air mixtures may ignite or explode.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: lung damage
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: no information is available
EYE CONTACT:
SHORT TERM EXPOSURE: mild irritation
LONG TERM EXPOSURE: no information on significant adverse effects
INGESTION:
SHORT TERM EXPOSURE: no information on significant adverse effects

LONG TERM EXPOSURE: no information on significant adverse effects

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash exposed skin with soap and water.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Finely divided material may ignite spontaneously. May ignite on exposure to air.

EXTINGUISHING MEDIA: dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride

Do not get water directly on material.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

LOWER FLAMMABLE LIMIT: <0.2 g/L

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Small spills: Collect spilled material in appropriate container for disposal. Move containers away from spill to a safe area. Large spills: Wet down area with water. Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Clean up residue with a high-efficiency particulate filter vacuum.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Keep material wetted. Store in compatible containers. Store in a cool, dry place.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TANTALUM:
TANTALUM METAL AND OXIDE DUSTS (as Ta):
5 mg/m3 OSHA TWA
5 mg/m3 ACGIH TWA
5 mg/m3 NIOSH recommended TWA 10 hour(s)
10 mg/m3 NIOSH recommended STEL
4 mg/m3 DFG MAK (inhalable dust fraction)
1.5 mg/m3 DFG MAK (respirable dust fraction)
5 mg/m3 UK WEL TWA (metal)
10 mg/m3 UK WEL STEL (metal)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total)

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Protective clothing is not required.

GLOVES: Protective gloves are not required, but recommended.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
Measurement Element:
Tantalum (Ta)
25 mg/m3
Any dust and mist respirator.
50 mg/m3
Any dust and mist respirator except single-use and quarter-mask respirators.
Any dust, mist, and fume respirator.
Any supplied-air respirator.
125 mg/m3
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with a dust and mist filter.
250 mg/m3
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a tight-fitting facepiece that is operated in a continuous-flow mode.
Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.

2500 mg/m3
Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Odorless, gray to bluish, hard, malleable, ductile metal or black powder. When polished the metal may be silver white.
MOLECULAR WEIGHT: 180.9
MOLECULAR FORMULA: TA
BOILING POINT: 9797 F (5425 C) approximate
MELTING POINT: 5425 F (2996 C)
VAPOR PRESSURE: 0.0 mmHg @ 20 C
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY (water=1): 16.69
WATER SOLUBILITY: insoluble
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: hydrofluoric acid, fused alkali, fuming sulfuric acid, nitric acid/hydrofluoric acid mixtures
Insoluble: acids, alkali

10. STABILITY AND REACTIVITY

REACTIVITY: Finely divided material may ignite spontaneously.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition.

INCOMPATIBILITIES: halogens, oxidizing materials, acids

TANTALUM:
BROMINE TRIFLUORIDE: Incandescent reaction.
FLUORINE: Ignites on contact.
LEAD CHROMATE: May react explosively.
MINERAL ACIDS: Incompatible.
OXIDIZERS (STRONG): Fire and explosion hazard.
SULFUR TRIOXIDE: Incompatable.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TANTALUM:
TOXICITY DATA:
595 mg/kg oral-mouse LD50
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
TUMORIGENIC DATA:
3760 mg/kg implant-rat TDLo

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
TANTALUM: Insufflation of the metal powder in humans was without adverse effects.

CHRONIC EXPOSURE:
TANTALUM: Repeated or prolonged exposure to tantalum alloys may have caused a mild fibrosis and chronic rhinitis in exposed workers and may play a role in producing "hard metal pneumoconiosis" in workers exposed to tantalum as well as other metals.

SKIN CONTACT:
ACUTE EXPOSURE:
TANTALUM: May cause irritation.

CHRONIC EXPOSURE:
TANTALUM: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
TANTALUM: Dusts may cause slight irritation.

CHRONIC EXPOSURE:
TANTALUM: Implantation of the metal into rabbit eyes for longer than a year has been reported to cause no significant adverse effects.

INGESTION:
ACUTE EXPOSURE:
TANTALUM: Large oral doses of tantalum compounds were well tolerated by rats indicating poor absorption.

CHRONIC EXPOSURE:
TANTALUM: Animal studies indicate absorption may occur.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: No classification assigned.

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR: No classification assigned.

LAND TRANSPORT RID: No classification assigned.

AIR TRANSPORT IATA: No classification assigned.

AIR TRANSPORT ICAO: No classification assigned.

MARITIME TRANSPORT IMDG: No classification assigned.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED):

F	Highly

	Flammable
Xn	Harmful

DANGER/HAZARD SYMBOL:

F

Xn

EC RISK AND SAFETY PHRASES:

R 17	Spontaneously flammable in air.
R 22	Harmful if swallowed.
S 2	Keep out of the reach of children.
S 13	Keep away from food, drink and animal feedingstuffs.
S 24	Avoid contact with skin.
S 36	Wear suitable protective clothing.
S 46	If swallowed, seek medical advice immediately and show this container or label.

GERMAN REGULATIONS:
WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: VwVwS
CLASSIFICATION UNDER HAZARD TO WATER: 0

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION
15. REGULATORY INFORMATION

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD
SUITE 3339
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: TANTALUM METAL POWDER, CAPACITOR GRADE 2

TRADE NAMES/SYNONYMS:
TANTALUM-181; TANTALUM POWDER; TANTALUM; Ta; 00229895; RTECS WW5505000

CHEMICAL FAMILY: metal

CREATION DATE: May 27 2003
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TANTALUM
CAS NUMBER: 7440-25-7
EC NUMBER (EINECS): 231-135-5
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=2
EMERGENCY OVERVIEW:
COLOR: blue to gray
PHYSICAL FORM: solid or powder
ODOR: odorless
MAJOR HEALTH HAZARDS: No significant target effects reported.
PHYSICAL HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Extremely flammable. May ignite spontaneously on exposure to air.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: lung damage
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: no information is available
EYE CONTACT:
SHORT TERM EXPOSURE: mild irritation
LONG TERM EXPOSURE: no information on significant adverse effects
INGESTION:
SHORT TERM EXPOSURE: no information on significant adverse effects

LONG TERM EXPOSURE: no information on significant adverse effects

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Finely divided material may ignite spontaneously. May ignite on exposure to air.

EXTINGUISHING MEDIA: dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

LOWER FLAMMABLE LIMIT: <0.2 g/L

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Small spills: Collect spilled material in appropriate container for disposal. Move containers away from spill to a safe area. Large spills: Wet down area with water. Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Clean up residue with a high-efficiency particulate filter vacuum.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Keep material wetted. Store in compatible containers. Store under an oxygen-free liquid (e.g., certain petroleum oils). Keep separated from incompatible substances.

HANDLING: Use methods to minimize dust.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TANTALUM METAL POWDER, CAPACITOR GRADE 2:
TANTALUM METAL AND OXIDE DUSTS (as Ta):
5 mg/m3 OSHA TWA
5 mg/m3 ACGIH TWA
5 mg/m3 NIOSH recommended TWA 10 hour(s)
10 mg/m3 NIOSH recommended STEL
4 mg/m3 DFG MAK (inhalable dust fraction)
1.5 mg/m3 DFG MAK (respirable dust fraction)
5 mg/m3 UK WEL TWA (metal)
10 mg/m3 UK WEL STEL (metal)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total)

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
Measurement Element:
Tantalum (Ta)
25 mg/m3
Any dust and mist respirator.
50 mg/m3
Any dust and mist respirator except single-use and quarter-mask respirators.
Any dust, mist, and fume respirator.
Any supplied-air respirator.
125 mg/m3
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with a dust and mist filter.
250 mg/m3
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a tight-fitting facepiece that is operated in a continuous-flow mode.
Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.

Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
2500 mg/m3
Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: blue to gray
PHYSICAL FORM: solid or powder
ODOR: odorless
MOLECULAR WEIGHT: 180.9
MOLECULAR FORMULA: Ta
BOILING POINT: 9797 F (5425 C) approximate
MELTING POINT: 5425 F (2996 C)
VAPOR PRESSURE: 0.0 mmHg @ 20 C
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
DENSITY: 16.69 g/cc
WATER SOLUBILITY: insoluble
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: hydrofluoric acid, fused alkali, fuming sulfuric acid, nitric acid/hydrofluoric acid mixtures
Insoluble: acids, alkali

10. STABILITY AND REACTIVITY

REACTIVITY: Finely divided material may ignite spontaneously.

CONDITIONS TO AVOID: Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition.

INCOMPATIBILITIES: halogens, oxidizing materials, acids

TANTALUM:
BROMINE TRIFLUORIDE: Incandescent reaction.
FLUORINE: Ignites on contact.
LEAD CHROMATE: May react explosively.
MINERAL ACIDS: Incompatible.
OXIDIZERS (STRONG): Fire and explosion hazard.

SULFUR TRIOXIDE: Incompatable.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of tantalum

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TANTALUM METAL POWDER, CAPACITOR GRADE 2:
TOXICITY DATA:
595 mg/kg oral-mouse LD50
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
TUMORIGENIC DATA:
3760 mg/kg implant-rat TDLo

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
TANTALUM: Insufflation of the metal powder in humans was without adverse effects.

CHRONIC EXPOSURE:
TANTALUM: Repeated or prolonged exposure to tantalum alloys may have caused a mild fibrosis and chronic rhinitis in exposed workers and may play a role in producing "hard metal pneumoconiosis" in workers exposed to tantalum as well as other metals.

SKIN CONTACT:
ACUTE EXPOSURE:
TANTALUM: May cause irritation.

CHRONIC EXPOSURE:
TANTALUM: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
TANTALUM: Dusts may cause slight irritation.

CHRONIC EXPOSURE:
TANTALUM: Implantation of the metal into rabbit eyes for longer than a year has been reported to cause no significant adverse effects.

INGESTION:
ACUTE EXPOSURE:
TANTALUM: Large oral doses of tantalum compounds were well tolerated by rats indicating poor absorption.

CHRONIC EXPOSURE:
TANTALUM: Animal studies indicate absorption may occur.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. D003.

14. TRANSPORT INFORMATION

ID

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Metal powders, flammable, n.o.s.
NUMBER: UN3089
HAZARD CLASS OR DIVISION: 4.1
PACKING GROUP: III
LABELING REQUIREMENTS: 4.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS: 4.1
PACKING GROUP/RISK GROUP: III

LAND TRANSPORT ADR:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS: 4.1
CLASSIFICATION CODE: F3
PACKING GROUP: III
LABELS: 4.1

LAND TRANSPORT RID:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS: 4.1
CLASSIFICATION CODE: F3
PACKING GROUP: III
LABELS: 4.1

AIR TRANSPORT IATA:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN/ID NUMBER: UN3089
CLASS OR DIVISION: 4.1
HAZARD LABELS: 4.1
PACKING GROUP: III

AIR TRANSPORT ICAO:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS OR DIVISION: 4.1

LABELS: 4.1
UN PACKING GROUP: III

MARITIME TRANSPORT IMDG:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS OR DIVISION: 4.1
PACKING GROUP: III

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: No
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED):

F	Highly Flammable
Xn	Harmful

DANGER/HAZARD SYMBOL:

EC RISK AND SAFETY PHRASES:

R 17	Spontaneously flammable in air.
R 22	Harmful if swallowed.
S 2	Keep out of the reach of children.
S 13	Keep away from food, drink and animal feedingstuffs.
S 24	Avoid contact with skin.
S 36	Wear suitable protective clothing.
S 46	If swallowed, seek medical advice immediately and show this container or label.

GERMAN REGULATIONS:
WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: VwVwS
CLASSIFICATION UNDER HAZARD TO WATER: 0

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION
15. REGULATORY INFORMATION

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD
SUITE 3339
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: TANTALUM METAL POWDER, CAPACITOR GRADES 1, 1A, 3, 4, 5

TRADE NAMES/SYNONYMS:
TANTALUM-181; TANTALUM POWDER; TANTALUM; Ta; DLA76954; RTECS WW5505000

CHEMICAL FAMILY: metal

CREATION DATE: Oct 01 1992
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TANTALUM
CAS NUMBER: 7440-25-7
EC NUMBER (EINECS): 231-135-5
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=2

EMERGENCY OVERVIEW:
COLOR: blue to gray
PHYSICAL FORM: solid or powder
ODOR: odorless
MAJOR HEALTH HAZARDS: No significant target effects reported.
PHYSICAL HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Extremely flammable. May ignite spontaneously on exposure to air.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: lung damage
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: no information is available
EYE CONTACT:
SHORT TERM EXPOSURE: mild irritation
LONG TERM EXPOSURE: no information on significant adverse effects
INGESTION:

SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: no information on significant adverse effects

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Finely divided material may ignite spontaneously. May ignite on exposure to air.

EXTINGUISHING MEDIA: dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

LOWER FLAMMABLE LIMIT: <0.2 g/L

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Small spills: Collect spilled material in appropriate container for disposal. Move containers away from spill to a safe area. Large spills: Wet down area with water. Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Clean up residue with a high-efficiency particulate filter vacuum.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Keep material wetted. Store in compatible containers. Store under an oxygen-free liquid (e.g., certain petroleum oils). Keep separated from incompatible substances.

HANDLING: Use methods to minimize dust.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TANTALUM METAL POWDER, CAPACITOR GRADES 1, 1A, 3, 4, 5:
TANTALUM METAL AND OXIDE DUSTS (as Ta):
5 mg/m3 OSHA TWA
5 mg/m3 ACGIH TWA
5 mg/m3 NIOSH recommended TWA 10 hour(s)
10 mg/m3 NIOSH recommended STEL
4 mg/m3 DFG MAK (inhalable dust fraction)
1.5 mg/m3 DFG MAK (respirable dust fraction)
5 mg/m3 UK WEL TWA (metal)
10 mg/m3 UK WEL STEL (metal)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total)

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
Measurement Element:
Tantalum (Ta)
25 mg/m3
Any dust and mist respirator.
50 mg/m3
Any dust and mist respirator except single-use and quarter-mask respirators.
Any dust, mist, and fume respirator.
Any supplied-air respirator.
125 mg/m3
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with a dust and mist filter.
250 mg/m3
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a tight-fitting facepiece that is operated in a continuous-flow mode.

Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
2500 mg/m3
Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: blue to gray
PHYSICAL FORM: solid or powder
ODOR: odorless
MOLECULAR WEIGHT: 180.9
MOLECULAR FORMULA: Ta
BOILING POINT: 9797 F (5425 C) approximate
MELTING POINT: 5425 F (2996 C)
VAPOR PRESSURE: 0.0 mmHg @ 20 C
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY (water=1): 16.69
WATER SOLUBILITY: insoluble
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: hydrofluoric acid, fused alkali, fuming sulfuric acid, nitric acid/hydrofluoric acid mixtures
Insoluble: acids, alkali

10. STABILITY AND REACTIVITY

REACTIVITY: Finely divided material may ignite spontaneously.

CONDITIONS TO AVOID: Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition.

INCOMPATIBILITIES: halogens, oxidizing materials, acids

TANTALUM:
BROMINE TRIFLUORIDE: Incandescent reaction.
FLUORINE: Ignites on contact.
LEAD CHROMATE: May react explosively.
MINERAL ACIDS: Incompatible.
OXIDIZERS (STRONG): Fire and explosion hazard.

SULFUR TRIOXIDE: Incompatable.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of tantalum

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TANTALUM METAL POWDER, CAPACITOR GRADES 1, 1A, 3, 4, 5:
TOXICITY DATA:
595 mg/kg oral-mouse LD50
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
TUMORIGENIC DATA:
3760 mg/kg implant-rat TDLo

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
TANTALUM: Insufflation of the metal powder in humans was without adverse effects.

CHRONIC EXPOSURE:
TANTALUM: Repeated or prolonged exposure to tantalum alloys may have caused a mild fibrosis and chronic rhinitis in exposed workers and may play a role in producing "hard metal pneumoconiosis" in workers exposed to tantalum as well as other metals.

SKIN CONTACT:
ACUTE EXPOSURE:
TANTALUM: May cause irritation.

CHRONIC EXPOSURE:
TANTALUM: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
TANTALUM: Dusts may cause slight irritation.

CHRONIC EXPOSURE:
TANTALUM: Implantation of the metal into rabbit eyes for longer than a year has been reported to cause no significant adverse effects.

INGESTION:
ACUTE EXPOSURE:
TANTALUM: Large oral doses of tantalum compounds were well tolerated by rats indicating poor absorption.

CHRONIC EXPOSURE:
TANTALUM: Animal studies indicate absorption may occur.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. D003.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Metal powders, flammable, n.o.s.
ID NUMBER: UN3089
HAZARD CLASS OR DIVISION: 4.1
PACKING GROUP: II
LABELING REQUIREMENTS: 4.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS: 4.1
PACKING GROUP/RISK GROUP: II

LAND TRANSPORT ADR:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS: 4.1
CLASSIFICATION CODE: F3
PACKING GROUP: II
LABELS: 4.1

LAND TRANSPORT RID:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS: 4.1
CLASSIFICATION CODE: F3
PACKING GROUP: II
LABELS: 4.1

AIR TRANSPORT IATA:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN/ID NUMBER: UN3089
CLASS OR DIVISION: 4.1
HAZARD LABELS: 4.1
PACKING GROUP: II

AIR TRANSPORT ICAO:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089

CLASS OR DIVISION: 4.1
LABELS: 4.1
UN PACKING GROUP: II

MARITIME TRANSPORT IMDG:
PROPER SHIPPING NAME: Metal powder, flammable, n.o.s.
UN NUMBER: UN3089
CLASS OR DIVISION: 4.1
PACKING GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: No
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED):

F	Highly Flammable
Xn	Harmful

DANGER/HAZARD SYMBOL:

F

Xn

EC RISK AND SAFETY PHRASES:

R 17	Spontaneously flammable in air.
R 22	Harmful if swallowed.
S 2	Keep out of the reach of children.
S 13	Keep away from food, drink and animal feedingstuffs.
S 24	Avoid contact with skin.
S 36	Wear suitable protective clothing.
S 46	If swallowed, seek medical advice immediately and show this container or label.

GERMAN REGULATIONS:
WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: VwVwS
CLASSIFICATION UNDER HAZARD TO WATER: 0

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION
15. REGULATORY INFORMATION

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD
SUITE 3339
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: TANTALUM MINERALS

TRADE NAMES/SYNONYMS:
DLANA391

CREATION DATE: Jul 24 1992
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TITANIUM DIOXIDE
CAS NUMBER: 13463-67-7
EC NUMBER (EINECS): 236-675-5
PERCENTAGE: <20.0

COMPONENT: STANNIC OXIDE
CAS NUMBER: 18282-10-5
EC NUMBER (EINECS): 242-159-0
PERCENTAGE: <20.0

COMPONENT: TANTALUM PENTOXIDE
CAS NUMBER: 1314-61-0
EC NUMBER (EINECS): 215-238-2
PERCENTAGE: >1.0

COMPONENT: NIOBIUM OXIDE
CAS NUMBER: 1313-96-8
EC NUMBER (EINECS): 215-213-6
PERCENTAGE: >1.0

COMPONENT: URANIUM OCTAOXIDE
CAS NUMBER: 1344-59-8
EC NUMBER (EINECS): 215-702-4
PERCENTAGE: <0.8

COMPONENT: THORIUM DIOXIDE
CAS NUMBER: 1314-20-1
EC NUMBER (EINECS): 215-225-1
PERCENTAGE: <0.5

COMPONENT: ANTIMONY

CAS NUMBER: 7440-36-0
EC NUMBER (EINECS): 231-146-5
PERCENTAGE: <0.01

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Small sized granular material.
MAJOR HEALTH HAZARDS: cancer hazard (in humans)

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, metal fume fever, chest pain, difficulty breathing
LONG TERM EXPOSURE: irritation
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
EYE CONTACT:
SHORT TERM EXPOSURE: irritation, tearing
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: no information on significant adverse effects

CARCINOGEN STATUS:
OSHA: No
NTP: Yes
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: Use extinguishing agents appropriate for surrounding fire.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

6. ACCIDENTAL RELEASE MEASURES

WATER RELEASE:
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Large spills: Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up residue with a high-efficiency particulate filter vacuum. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TITANIUM DIOXIDE:
15 mg/m3 OSHA TWA (total dust)
10 mg/m3 OSHA TWA (total particulate) (vacated by 58 FR 35338, June 30, 1993)
10 mg/m3 ACGIH TWA
1.5 mg/m3 DFG MAK (respirable dust fraction)
10 mg/m3 UK WEL TWA (total inhalable dust)
4 mg/m3 UK WEL TWA (respirable dust)

MEASUREMENT METHOD: Particulate filter; Acid; Flame atomic absorption spectrometry; NIOSH II(3) # S385

STANNIC OXIDE:
TIN AND INORGANIC TIN COMPOUNDS (as Sn):
2 mg/m3 OSHA TWA
2 mg/m3 ACGIH TWA
2 mg/m3 NIOSH recommended TWA 10 hour(s)
2 mg/m3 EC OEL
2 mg/m3 UK WEL TWA
4 mg/m3 UK WEL STEL

MEASUREMENT METHOD: Particulate filter; Acid; Inductively coupled plasma; NIOSH IV # 7300, Elements

TANTALUM PENTOXIDE:
TANTALUM METAL AND OXIDE DUSTS (as Ta):
5 mg/m3 OSHA TWA

5 mg/m3 ACGIH TWA
5 mg/m3 NIOSH recommended TWA 10 hour(s)
10 mg/m3 NIOSH recommended STEL
4 mg/m3 DFG MAK (inhalable dust fraction)
1.5 mg/m3 DFG MAK (respirable dust fraction)
5 mg/m3 UK WEL TWA (metal)
10 mg/m3 UK WEL STEL (metal)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total)

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
Any dust, mist, and fume respirator.
Any air-purifying respirator with a high-efficiency particulate filter.
Any powered, air-purifying respirator with a dust, mist, and fume filter.
Any powered, air-purifying respirator with a high-efficiency particulate filter.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Small sized granular material.
BOILING POINT: Not applicable
MELTING POINT: Not available
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
WATER SOLUBILITY: Not available
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid generating dust.

INCOMPATIBILITIES: metals, halogens, reducing agents

TITANIUM DIOXIDE:
ALUMINUM: Reaction is accompanied by incandescence.
CALCIUM: Reaction is accompanied by incandescence.
LITHIUM: Reaction occurs around 200 C, with incandescence.
MAGNESIUM: Reaction is accompanied by incandescence.
POTASSIUM: Reaction is accompanied by incandescence.
SODIUM: Reaction is accompanied by incandescence.
ZINC: Reaction is accompanied by incandescence.

TANTALUM PENTOXIDE:
BROMINE TRIFLUORIDE: React vigorously.
CHLORINE TRIFLUORIDE: Reacts violently, producing flame.
LITHIUM: Reaction occurs around 410 C with consequent temperature rise to 595 C.

NIOBIUM OXIDE:
CHLORINE TRIFLUORIDE: Incompatible.
LITHIUM: Reacts violently and exothermically at 320 C to 490 C.

STANNIC OXIDE:
CHLORINE TRIFLUORIDE: Violent reaction, ignition often occurring.
HYDROGEN TRISULFIDE: Possible ignition.
MAGNESIUM: Explodes when heated.
POTASSIUM: Reduced with incandescence.
SODIUM: Reduced with incandescence.
ALUMINUM: Reduced violently or explosively.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TITANIUM DIOXIDE:
IRRITATION DATA:
300 ug/3 day(s)-intermittent skin-human mild
TOXICITY DATA:
6820 mg/m3/4 hour(s) inhalation-rat LC50; >24000 mg/kg oral-rat LD50; >100 ug/kg intratracheal-rat LD; 60 gm/kg oral-rat TDLo; 100 mg/kg intratracheal-mouse TDLo; 250 mg/m3/6 hour(s)-4 week(s) intermittent inhalation-rat TCLo; 50 mg/m3/6 hour(s)-13 week(s) intermittent inhalation-rat TCLo; 10 mg/m3/6 hour(s)-13 week(s) intermittent inhalation-mouse TCLo; 250 mg/m3/6 hour(s)-13 week(s) intermittent inhalation-hamster TCLo
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3; ACGIH: A4 -Not Classifiable as a Human Carcinogen

Increased incidences of lung adenomas in rats of both sexes and of cystic keratinizing lesions diagnosed as squamous-cell carcinomas in female rats were observed in animals that had inhaled high but not low doses of titanium dioxide. Intratracheal administration of titantium dioxide in combination with benzo(a)pyrene to hamsters resulted in an increase in the incidence of benign and malignant tumors of the larynx, trachea and lungs over that in benzo(a)pyrene-treated controls.
ACUTE TOXICITY LEVEL:
Moderately Toxic: inhalation
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
TUMORIGENIC DATA:
250 mg/m3 inhalation-rat TCLo/6 hour(s)-2 year(s) intermittent; 360 mg/kg intramuscular-rat TDLo/2 year(s) intermittent; 260 mg/kg intramuscular-rat TD/84 week(s) intermittent; 10 mg/m3 inhalation-rat TC/18 hour(s)-2 year(s) intermittent
MUTAGENIC DATA:
micronucleus test - mouse intraperitoneal 3 gm/kg 3 day(s)-continuous; micronucleus test - hamster ovary 5 umol/L; DNA inhibition - hamster lung 500 mg/L; sister chromatid exchange - hamster ovary 1 umol/L

STANNIC OXIDE:
TOXICITY DATA:
>20 gm/kg oral-rat LD50; >6600 mg/kg intraperitoneal-rat LD50; >20 gm/kg oral-mouse LD50; >6600 mg/kg intraperitoneal-mouse LD50
ACUTE TOXICITY LEVEL: Insufficient Data.

TANTALUM PENTOXIDE:
TOXICITY DATA:
>5 gm/kg intraperitoneal-rat LD; >4 gm/kg oral-mouse LD50; 8000 mg/kg oral-rat LD50; 4000 mg/kg oral-mouse LD50; 3500 mg/kg intraperitoneal-mouse LD50; 250 mg/kg intratracheal-rat TDLo; 130 mg/m3/2 hour(s)-17 week(s) intermittent inhalation-rat TCLo
ACUTE TOXICITY LEVEL:
Slightly Toxic: ingestion

NIOBIUM OXIDE:
TOXICITY DATA:
>10 gm/kg oral-rat LD; >10 gm/kg intraperitoneal-rat LD; >4 gm/kg oral-mouse LD50; >10 gm/kg intraperitoneal-mouse LD; 4000 mg/kg oral-mouse LD50; 250 mg/kg intratracheal-rat TDLo; 60 gm/kg/6 week(s) intermittent oral-rat TDLo
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
ADDITIONAL DATA: In vitro studies indicate that the inhibition of adenosine triphosphatase may be involved with the biological activity of niobium.

THORIUM DIOXIDE:
TOXICITY DATA:
>1140 mg/kg intratracheal-rat LD50; 8 gm/kg parenteral-mammal TDLo
CARCINOGEN STATUS: NTP: Known Human Carcinogen; EC: Category 1
Intravascular injection in humans produced tumors of the liver, including hepatocellular carcinomas, cholangiocellular carcinomas, carcinomas of the extra-hepatic biliary system, sarcomas, hemangioendotheliomas, reticulum cell sarcomas, carcinomas of the common hepatic duct, adenocarcinomas, liver cell carcinomas, undifferentiated carcinomas, hepatomas, tumors of the kidney, including carcinomas of the renal parenchyma, and sarcomas and carcinomas of the renal pelvis. In addition, carcinomas of the maxillary sinuses, spindle cell sarcomas in the later cervical region, leukemias, and other hematologic disorders have been related to intravascular injection of thorium dioxide. Studies suggest a latency of 21-36 years. A variety of carcinomas have been induced in animals

following intravenous, subcutaneous, and submucousal administration.
ACUTE TOXICITY LEVEL: Insufficient Data.
TUMORIGENIC DATA:
1 gm/kg parenteral-woman TDLo; 2880 mg/kg unreported-human TDLo; 490 mg/kg intraarterial-human TDLo; 160 mg/kg intravenous-rat TDLo; 20 gm/kg subcutaneous-mouse TDLo; 10 gm/kg intravenous-mouse TDLo; 400 mg/kg intramuscular-mouse TDLo; 1500 mg/kg intravenous-rabbit TDLo; 4 gm/kg parenteral-guinea pig TDLo/15 week(s) intermittent; 2 gm/kg unreported-hamster TDLo; 3600 mg/kg intravenous-rabbit TD; 300 mg/kg intravenous-rabbit TD/2 year(s) intermittent; 700 mg/kg parenteral-human TD; 1260 mg/kg parenteral-human TD; 2 gm/kg intraarterial-woman TD; 10 mg/kg intravenous-mouse TD; 2350 mg/kg parenteral-woman TD; 1190 mg/kg intraarterial-man TD; 1302 mg/kg intraarterial-human TD
ADDITIONAL DATA: Radioactive.

HEALTH EFFECTS:
INHALATION:
STANNIC OXIDE: May cause chest pain, dyspnea, rales, and leukocytosis. Repeated exposure may cause stannosis, a benign pneumoconiosis, without symptoms of interference of pulmonary function. See information on inorganic tin compounds and metal fume fever.

ACUTE EXPOSURE:
TITANIUM DIOXIDE: Inhalation may cause irritation and coughing. Nuisance dusts may cause unpleasant deposits in the nasal passages.

INORGANIC TIN COMPOUNDS: Exposure to some inorganic tin compounds may result in irritation of the mucous membranes, nose, and throat.

METAL FUME FEVER: Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

TANTALUM PENTOXIDE: Tantalum dust has a low order of toxicity and is relatively inert. It has produced transient inflammatory lesions in the lungs of animals after severe exposure.

NIOBIUM OXIDE: Dust may cause respiratory irritation.

CHRONIC EXPOSURE:
TITANIUM DIOXIDE: A few cases of slight fibrosis without disabling injury have been reported from occupational exposure. Rats repeatedly exposed to concentrations of 10-328 million particles/ft3 for as long as 13 months showed small focal areas of emphysema which were attributed to large deposits of dust. Rats exposed to concentrations of 10, 50, and 250 mg/m3 for 6 hours/day, 5 days/week for 2 years showed no abnormal clinical signs, body weight changes, or excess mortality in any exposed group. There were however dose-dependent increases in the incidence of pneumonia, tracheitis and rhinitis with squamous metaplasia in the anterior nasal cavity. At 10 mg/m3, the pulmonary response satisfied the criteria for a nuisance dust. Bronchioalveolar adenomas and cystic keratinizing squamous cell carcinomas occurred only at the 250 mg/m3 level, twenty-five times the threshold limit value. These lung tumors were different from common human lung cancers in terms of tumor type, location, and tumorigenesis, and were devoid of tumor metastasis.

INORGANIC TIN COMPOUNDS: No data available.

METAL FUME FEVER: There is no form of chronic metal fume fever, however, repeated bouts with symptoms as described above are quite common. Resistance to the condition develops after a few days of exposure, but is quickly lost in 1 or 2 days.

TANTALUM PENTOXIDE: Repeated or prolonged exposure to tantalum dust may cause bronchitis.

NIOBIUM OXIDE: No data available.

SKIN CONTACT:
ACUTE EXPOSURE:
TITANIUM DIOXIDE: Topically it is reported to be devoid of toxicity and chemically non-irritating. However, titanium dioxide may occasionally be so occlusive that it produces miliaria.

STANNIC OXIDE: It is not absorbed and is relatively innocuous to the skin.

TANTALUM PENTOXIDE: May cause irritation.

NIOBIUM OXIDE: May cause irritation.

CHRONIC EXPOSURE:
TITANIUM DIOXIDE: Application of 300 ug for 3 days intermittently to human skin produced mild irritation.

STANNIC OXIDE: No data available.

TANTALUM PENTOXIDE: No data available.

NIOBIUM OXIDE: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
TITANIUM DIOXIDE: Introduction by tatooing into the cornea of rabbit eyes and patients with corneal scars resulted in permanent white coloration, but no irritation.

STANNIC OXIDE: Particulates in the eye may cause irritation and lacrimation.

TANTALUM PENTOXIDE: May cause slight irritation.

NIOBIUM OXIDE: May cause irritation.

CHRONIC EXPOSURE:
TITANIUM DIOXIDE: No data available.

STANNIC OXIDE: No data available.

TANTALUM PENTOXIDE: No data available.

NIOBIUM OXIDE: Repeated or prolonged contact may cause conjunctivitis.

INGESTION:
ACUTE EXPOSURE:
TITANIUM DIOXIDE: Titanium dioxide has been reported to be physiologically inert. Ingestion of large quantities may cause intestinal obstruction. However, a pound has been ingested without apparent harm

or distress.

STANNIC OXIDE: Most tin salts are relatively non-toxic and poorly absorbed through the gastrointestinal tract.

TANTALUM PENTOXIDE: No data available.

NIOBIUM OXIDE: Metallic niobium is poorly absorbed in the stomach and intestines.

CHRONIC EXPOSURE:
TITANIUM DIOXIDE: Mice and rats fed 50,000 and 25,000 ppm for 103 weeks showed no evidence of toxicity and no increased incidence of tumors.

STANNIC OXIDE: Chronic feeding studies utilizing rats for 4-13 weeks at levels of 0.03%, 0.10%, 0.30% and 1.0% percent resulted in no adverse effects.

TANTALUM PENTOXIDE: No data available.

NIOBIUM OXIDE: Metallic niobium in the drinking water at 5 ppm and in the diet at 1.62 mg/kg caused liver degeneration in animal studies.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: No classification assigned.

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR: No classification assigned.

LAND TRANSPORT RID: No classification assigned.

AIR TRANSPORT IATA: No classification assigned.

AIR TRANSPORT ICAO: No classification assigned.

MARITIME TRANSPORT IMDG: No classification assigned.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
ANTIMONY: 5000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: No
CHRONIC: Yes
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
THORIUM DIOXIDE

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
THORIUM DIOXIDE
Cancer (Feb 27, 1987)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED): Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION
11. TOXICOLOGICAL INFORMATION

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD
SUITE 3339
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: TANTALUM PENTOXIDE

TRADE NAMES/SYNONYMS:
TANTALUM OXIDE; TANTALIC ACID ANHYDRIDE; TANTALUM PENTA OXIDE; TANTALUM (V) OXIDE; TANTALUM PENTOXIDE ELECTRONIC GRADE (SHIELDALLOY CORPORATION); O5TA2; DLA22450; RTECS WW5855000

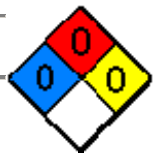
CHEMICAL FAMILY: metal oxides

CREATION DATE: Jul 01 1992
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TANTALUM PENTOXIDE
CAS NUMBER: 1314-61-0
EC NUMBER (EINECS): 215-238-2
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION



NFPA RATINGS (SCALE 0-4): HEALTH=0 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Odorless, white to yellow microcrystalline, infusible powder, lumps or pieces.
MAJOR HEALTH HAZARDS: No significant target effects reported.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: no information on significant adverse effects
SKIN CONTACT:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: no information is available
EYE CONTACT:
SHORT TERM EXPOSURE: mild irritation
LONG TERM EXPOSURE: no information is available
INGESTION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: no information is available

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash exposed skin with soap and water.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: Use extinguishing agents appropriate for surrounding fire.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Large spills: Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up residue with a high-efficiency particulate filter vacuum.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Store in a tightly closed container. Store in a cool, dry place. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TANTALUM PENTOXIDE:
TANTALUM METAL AND OXIDE DUSTS (as Ta):
5 mg/m3 OSHA TWA
5 mg/m3 ACGIH TWA
5 mg/m3 NIOSH recommended TWA 10 hour(s)
10 mg/m3 NIOSH recommended STEL
4 mg/m3 DFG MAK (inhalable dust fraction)
1.5 mg/m3 DFG MAK (respirable dust fraction)

5 mg/m3 UK WEL TWA (metal)
10 mg/m3 UK WEL STEL (metal)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total)

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Protective clothing is not required.

GLOVES: Protective gloves are not required, but recommended.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
Measurement Element:
Tantalum (Ta)
25 mg/m3
Any dust and mist respirator.
50 mg/m3
Any dust and mist respirator except single-use and quarter-mask respirators.
Any dust, mist, and fume respirator.
Any supplied-air respirator.
125 mg/m3
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with a dust and mist filter.
250 mg/m3
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a tight-fitting facepiece that is operated in a continuous-flow mode.
Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
2500 mg/m3
Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Odorless, white to yellow microcrystalline, infusible powder, lumps or pieces.
MOLECULAR WEIGHT: 441.89
MOLECULAR FORMULA: TA2-O5
BOILING POINT: Not applicable
MELTING POINT: 3384-3420 F (1862-1882 C)
VAPOR PRESSURE: Not applicable

VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY (water=1): 8.2
WATER SOLUBILITY: insoluble
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: hydrofluoric acid
Insoluble: alcohol, mineral acids

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid generating dust.

INCOMPATIBILITIES: halogens, metals

TANTALUM PENTOXIDE:
BROMINE TRIFLUORIDE: React vigorously.
CHLORINE TRIFLUORIDE: Reacts violently, producing flame.
LITHIUM: Reaction occurs around 410 C with consequent temperature rise to 595 C.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TANTALUM PENTOXIDE:
TOXICITY DATA:
>5 gm/kg intraperitoneal-rat LD; >4 gm/kg oral-mouse LD50; 8000 mg/kg oral-rat LD50; 4000 mg/kg oral-mouse LD50; 3500 mg/kg intraperitoneal-mouse LD50; 250 mg/kg intratracheal-rat TDLo; 130 mg/m3/2 hour(s)-17 week(s) intermittent inhalation-rat TCLo
ACUTE TOXICITY LEVEL:
Slightly Toxic: ingestion

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
TANTALUM PENTOXIDE: Tantalum dust has a low order of toxicity and is relatively inert. It has produced transient inflammatory lesions in the lungs of animals after severe exposure.

CHRONIC EXPOSURE:
TANTALUM PENTOXIDE: Repeated or prolonged exposure to tantalum dust may cause bronchitis.

SKIN CONTACT:
ACUTE EXPOSURE:

TANTALUM PENTOXIDE: May cause irritation.

CHRONIC EXPOSURE:
TANTALUM PENTOXIDE: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
TANTALUM PENTOXIDE: May cause slight irritation.

CHRONIC EXPOSURE:
TANTALUM PENTOXIDE: No data available.

INGESTION:
ACUTE EXPOSURE:
TANTALUM PENTOXIDE: No data available.

CHRONIC EXPOSURE:
TANTALUM PENTOXIDE: No data available.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: No classification assigned.

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR: No classification assigned.

LAND TRANSPORT RID: No classification assigned.

AIR TRANSPORT IATA: No classification assigned.

AIR TRANSPORT ICAO: No classification assigned.

MARITIME TRANSPORT IMDG: No classification assigned.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: No
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED): Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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J.5 FEDWIRE AND ELECTRONIC FUNDS TRANSFER PROCEDURES (OCT 05, Rev.)

Fedwire (wire transfer)

The Sender must use a bank that offers Fedwire funds transfer capability. Information regarding Fedwire, including listings of Fedwire funds transfer participants, may be found at http://www.frbservices.org.

To ensure the funds are credited to the Defense National Stockpile Center the following information is required for any wire transfer of funds.

1. Bank Name, Location, and Routing Number.

   Bank Name: TREAS NYC
   Location: New York, NY
   Routing Number: 021030004

2. Amount of funds to be transferred.

3. Beneficiary Name: 6355
   DFAS/DNSC

4. Third Party Information – Contractor's Name, Commodity, and Contract Number.

NOTE:
Under Item 3, the number 6355 is the ALC = Agency Location Code (this is the same as account number)

Electronic Funds Transfer

The following information is required for payments made through electronic funds transfer.

1. Bank Name, Location, Bank Number, SWIFT Code, and Account Number.

   Bank Name: Mellon Bank
   Location: Pittsburgh, PA
   Bank Number: 043000261
   Bank SWIFT Code: MELNUS3P
   Account Number: 910-1027

2. Amount of funds to be transferred.

3. Beneficiary Name: Department of Defense DFAS

4. Addendum Information: Payment for DNSC Contract No._____
   Invoice No. _____