obalt Based	Alloys											
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afety	Data Sh	neet					DVAN	ICED	VIATE	RIALS	6	
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Sectio	n 1: Ide	ntificat	ion of	f the Subs	tance/M	lixture	and o	f the Co	mpan	y/Undei	taking	÷
.1 Pro	duct ide	entifier						• •		1:1		
Produc	t Name			Cobalt Ba								
Synonyn	ns		•	Alloy (X); CO Haynes (X);) (X); Cob HS(X): L-	alt (X); C 605: MA	oCrMo; R M (X)	ECY(X); F : MERL (X	(X); FS)): MM(X	(-414; GR): Nicralliu	ADE(X); G um (x): PT(X(X); X): PWA
				(X); RM-(x);	Star (X); S	Stellite (X	(); Stood	ly (X); Trib	alloy® (x); WI (X);	X-(X)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
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elevant	t identifie	d use(s)	•	Cast ingots downstream downstream	processo	ors who r	and dir emelt th	nensions. le superall	Ingots a oys into	re sold ar products	nd distribut used withi	ed to n various
.3 Det	ails of t	he sup	plier d	of the safe	ty data s	sheet			1.1			1.1
lanufac	turer		•	Stanford Ad E-mail : sale Tel : (949) 4	es@samat		om					
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111 111	Felephon	e (Gene	•	Address : 23	3661 Birtc				02630 U		: :	· ·
÷	:::		ral) •	Address : 23	3661 Birtc)4						:** }-1	·
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11	Hazard	statements •	H317 - May cause an allergic skin reaction H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled H351 - Suspected of causing cancer. H361fd - Suspected of damaging fertility. Suspected of damaging the unborn child.	
Preca	utionary	statements	H372 - Causes damage to organs through prolonged or repeated exposure. H373 - May cause damage to organs through prolonged or repeated exposure.	
	,		P201 - Obtain special instructions before use.	
		Flevention •	P201 - Obtain special instituctions before use. P202 - Do not handle until all safety precautions have been read and understood. P260 - Do not breathe dust or fume. P264 - Wash thoroughly after handling.	:
11	н. -		 P270 - Do not eat, drink or smoke when using this product. P272 - Contaminated work clothing should not be allowed out of the workplace. P280 - Wear protective gloves/protective clothing/eye protection/face protection. P284 - In case of inadequate ventilation wear respiratory protection. 	•
		Response •	P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for	
÷.,	:-:		breathing. P342+P311 - If experiencing respiratory symptoms: Call a POISON CENTER/doctor.	
14	11	11 Ja	 P302+P352 - IF ON SKIN: Wash with plenty of water. P321 - Specific treatment, see supplemental first aid information. P362+P364 - Take off contaminated clothing and wash it before reuse. P333+P313 - If skin irritation or rash occurs: Get medical advice/attention. P308+P313 - IF exposed or concerned: Get medical advice/attention. P314 - Get medical advice/attention if you feel unwell. 	
	Stor	age/Disposal •	P405 - Store locked up. P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.	•
2.3 Oth	ner Haza	irds	- -	
11.				: :
		• • : : •	May form combustible dust concentrations in air. Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.	

UN GHS Revision 3

According to: UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS): Third Revised Edition

	N GHS	tion of 1		Ibstance or n Skin Sensitiza Eye Irritation 2 Respiratory Se Carcinogenicit Reproductive 1 Specific Targe	tion 1 ensitization 1 y 2 oxicity 2		ted Expos	sure 1	ad Ni	::: ::		
	Label elen N GHS	nents						11		;	111	•
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			11.			11.		111	· · · ·	: • •			
	Hazard	stateme	ents •	May cause	an allergi	c skin r	eaction						
1.1			1.1	Causes seri					1.1	1.1		1.1	
				May cause				ns or brea	thing di	fficulties if	inhaled		
				Suspected of									
				Suspected of						d aveau			
				Causes dan		igans u	liough pro		repeate	u exposui	e.		
reca	autionary	stateme	ents	11.			11.		1.			1.	
		Preven	tion •	Obtain spec	ial instru	ctions b	efore use						
		1.1	1.	Do not hand				ons have b	een rea	d and und	erstood.	1.	
			111	Do not brea									
				Wash thorou Do not eat,	drink or s	moke w	ny. /hen usin	a this prod	luct				
				Contaminate	ed work c	lothina	should no	ot be allow	ed out o	of the work	place.		
	: .			Wear protect	tive glove	es/prote	ctive clot	hing/eye p	rotectio	n/face prot	ection.		
				Use persona	al protecti	ve equi	pment as	required.					
				In case of in	adequate	e ventila	tion wear	respirator	y protec	tion.			
		Respo	onse •	IF INHALED	: If breat	ning is c	lifficult, re	move victi	m to fre	sh air and	keep at re	est in a	
	· · ·			position con							;''' 		
				If experience IF ON SKIN	ng respir	atory sy	inptoms:	Call a PC	N CON C	ENTER 0	aoctor/pr	iysician.	
				Specific trea						on.			
÷			11.	Wash conta								÷	
				If skin irritati	on or ras	h occur	s: Get m	edical adv					
				IF IN EYES					eral mir	utes. Rem	iove conta	ict lenses	s,
			1.1	if present an	id easy to	o do. Co	ontinue rir	nsing.	ntion			1.1	
				If eye irritati IF exposed	or conce	ned Gel	nteuical a	l advice/alle	tention				
				Get medical									
	Stor	age/Disp	osal .	Store locked			ii you ioc						
1		ageipisp		Dispose of o		nd/or co	ntainer ir	accordar	ce with	local, regi	onal. natic	onal. and/	/o
				internationa						··· , · J	,	- ,	-
3 Ot	ther haza	rds			-								
UN C				May form co	mhuetihl	: . A diret a	concentra	tions in ai	r ¹ 1.			÷	
				Heating abo						s which m	av cause	metal fur	ne
				fever by inh	alation. T	he symp	otoms are	shivering	, fever, i	malaise ar	id muscula	ar pain.	
	1.			According to				System f	or Class	sification a	nd Labelin	ig (GHS)	l
				this product	is consid	lered na	azardous						
sitor	d Stataa (_
hiet	d States (D 1010	.1200 HCS									
coru	ing to: OSF	IA 29 CF	K IJIU	1200 605		1.1							
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1 Cl	assificat	_			•			;**	11	·:.		111	
		ion of th	he su	bstance o	r mixtu	re							
OSH	A HCS 201		1.1.1	bstance o Skin Sensiti		re		: []	·		: [14		
OSH			1.1.1	Skin Sensiti Eye Irritatior	zation 1 n 2								
OSH			1.1.1	Skin Sensiti Eye Irritation Respiratory	zation 1 1 2 Sensitiza								
OSH			1.1.1	Skin Sensiti Eye Irritatior Respiratory Carcinogeni	zation 1 1 2 Sensitiza city 2	ation 1							
OSH			1.1.1	Skin Sensiti Eye Irritation Respiratory Carcinogeni Reproductiv	zation 1 2 Sensitiza city 2 e Toxicity	ation 1	ed St	::					
OSH			1.1.1	Skin Sensiti Eye Irritation Respiratory Carcinogeni Reproductiv Specific Tar	zation 1 2 Sensitiza city 2 e Toxicity get Orga	ation 1	ed St	::					
OSH			1.1.1	Skin Sensiti Eye Irritation Respiratory Carcinogeni Reproductiv Specific Tar Combustible	zation 1 2 Sensitiza city 2 e Toxicity get Organ Dust	ation 1 / 2 n Toxici	ty Repea	ted Expos	ure 1	ed Tati	:.: · :		
· · ·	IA HCS 201	2	1.1.1	Skin Sensiti Eye Irritation Respiratory Carcinogeni Reproductiv Specific Tar	zation 1 2 Sensitiza city 2 e Toxicity get Organ Dust	ation 1 / 2 n Toxici	ty Repea	ted Expos	ure 1	ed Tati	:.: · :		
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2 La	A HCS 201 abel elem	2 ents	1.1.1	Skin Sensiti Eye Irritation Respiratory Carcinogeni Reproductiv Specific Tar Combustible	zation 1 1 2 Sensitiza city 2 e Toxicity get Orga Dust t Otherwi	ation 1 / 2 n Toxici	ty Repea	ted Expos	ure 1	ed Tati	:.: · :		
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Cobalt Based Allovs	Cobalt	Based	Allovs	5
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	Hazard	stateme	ents •	May cause	an aller	aic skin i	reaction						
1.1				Causes ser	rious eve	e irritation	1 ', '		1.1			1.1	
	1.			May cause				ms or brea	athing di	fficulties if	inhaled		
				Suspected	of causi	ng cance	er.		•				
				Suspected	of dama	ging fert	lity or the	unborn c	hild.				
				Causes da	mage to	organs ti	hrough pr	olonged o	r repeate	ed exposu	re.		
111	· · ·		111	May form c	compusti	ble dust	concentra	ations in a	ir.			111	
Preca	utionary												
		Preven	tion •	Obtain spe									
· · · ·			· · · ·	Do not han				ons have I	been rea	d and und	lerstood.	11.	
				Do not brea Wash thoro									
				Do not eat,				na this nro	duct				
11	1.		111	Contaminat	ted work	clothing	should no	of be allow	ved out a	of the worl	kolace '	111	
				Wear prote									
				In case of i									
		Respo	onse •	IF INHALEI	•			•			l keep at r	est in a	
1.1	. :	licebe		position col	mfortable	e for brea	athing.						
				If experience				Call a PO	DISON C	ENTER C	or doctor/p	hysician	
				If on skin: \	Nash wit	th plenty	of water				•	5	
÷	:		÷	Specific tre					nformatio	n.		1.	
	1.11			Wash conta	aminated	d clothing	before re	euse.			1		
				If skin irrita							novo oont	o ot longo	
				IF IN EYES					veral mir	iutes. Ren	nove conta	actiense	es,
	1.			if present a If eye irritat	tion pers	ists: Cot	medical 4	nsing. advice/attr	antion	1.			
				IF exposed	or conc	erned [.] G	et medica	al advice/all	ttention				
				Get medica									
	Stor	age/Disp	osal •	Store locke		allention							
· : :	Stor	age/Dispo	osal •	Store locke Dispose of	ed up. content	and/or c	-		nce with	local, reg	ional, natio	onal, and	d/o
3 Oth			osal •		ed up. content	and/or c	-		nce with	local, reg	ional, natio	onal, and	d/o
	her haza	rds	osal •	Dispose of internationa	ed up. content al regulat	and/or co tions.	ontainer ir	n accorda			:.:		
		rds	osal • •	Dispose of internationa Heating ab	ed up content al regulat ove the r	and/or co tions. melting p	ontainer in	n accorda	lic oxide	s which m	nay cause	metal fu	
	her haza	rds	osal • •	Dispose of internationa Heating ab fever by inf	ed up, content al regulat ove the r nalation.	and/or co tions. melting p The sym	ontainer in point relea ptoms are	n accorda ises metal e shivering	llic oxide , fever,	s which m malaise ar	nay cause nd muscul	metal fu ar pain.	
	her haza	rds	osal • •	Dispose of internationa Heating ab fever by inf Under Unite	ed up. content al regulat ove the r nalation. ed States	and/or co tions. melting p The sym s Regula	ontainer ir point relea ptoms are tions (29	n accorda ises metal e shivering CFR 1910	llic oxide g, fever,).1200 -	s which m malaise ar	nay cause nd muscul	metal fu ar pain.	
	her haza	rds	osal • •	Dispose of internationa Heating ab fever by inf	ed up. content al regulat ove the r nalation. ed States	and/or co tions. melting p The sym s Regula	ontainer ir point relea ptoms are tions (29	n accorda ises metal e shivering CFR 1910	llic oxide g, fever,).1200 -	s which m malaise ar	nay cause nd muscul	metal fu ar pain.	
OSHA anada	her haza A HCS 201 a	rds 2	•	Dispose of internationa Heating ab fever by inf Under Unite	ed up. content al regulat ove the r nalation. ed States	and/or co tions. melting p The sym s Regula	ontainer ir point relea ptoms are tions (29	n accorda ises metal e shivering CFR 1910	llic oxide g, fever,).1200 -	s which m malaise ar	nay cause nd muscul	metal fu ar pain.	
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OSHA anada	her haza A HCS 201 a	rds 2	···· ····•	Dispose of internationa Heating ab fever by inf Under Unite	ed up, content al regulat ove the r nalation, ed States this proc	and/or co tions. melting p The sym s Regula duct is co	ontainer in point relea ptoms are tions (29 onsidered	n accorda ses metal e shivering CFR 1910 hazardou	llic oxide g, fever, 1 0.1200 - s.	s which m malaise ai Hazard Co	nay cause nd muscul ommunica	metal fu ar pain. tion	
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OSHA anada cordir 1 Cla	her haza A HCS 201 a ng to: WH assificati	rds 2 MIS 2015	ne su	Dispose of international Heating ab fever by inf Under Unite Standard),	ed up, content al regulat ove the r nalation. ed States this proc	and/or co tions. melting p The sym s Regula duct is co	ontainer in point relea ptoms are tions (29 onsidered	n accorda ises metal e shivering CFR 1910 hazardou	llic oxide g, fever, 1 0.1200 - s.	s which m malaise ar Hazard Co	nay cause nd muscul ommunica	metal fu ar pain. tion	
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OSHA anada cordir	her haza A HCS 201 a ng to: WH assificati	rds 2 MIS 2015	ne su	Dispose of international Heating ab fever by inf Under Unite Standard),	ed up, content al regulat ove the r nalation. ed States this proc	and/or co tions. melting p The sym s Regula duct is co duct is co	ontainer in point relea ptoms are tions (29 onsidered	n accorda ises metal e shivering CFR 1910 hazardou	llic oxide g, fever, 1 0.1200 - s.	s which m malaise ar Hazard Co	nay cause nd muscul ommunica	metal fu ar pain. tion	
OSHA anada cordir	her haza A HCS 201 a ng to: WH assificati	rds 2 MIS 2015	ne su	Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory	ed up, content al regulat ove the r halation. ed States this proc or mixt tization 1 on 2 y Sensitiz	and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1	ontainer in point relea ptoms are tions (29 onsidered	n accorda ises metal e shivering CFR 1910 hazardou	llic oxide g, fever, 1).1200 - s.	s which m malaise ai Hazard Co	nay cause nd muscul ommunica	metal fu ar pain. tion	
OSHA anada cordir	her haza A HCS 201 a ng to: WH assificati	rds 2 MIS 2015	ne su	Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproductiv	ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici	and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1	ontainer in point relea ptoms are tions (29 onsidered	n accorda ises metal e shivering CFR 1910 hazardou	llic oxide , fever, 1 0.1200 - s.	s which m malaise ai Hazard Co	nay cause nd muscul ommunica	metal fu ar pain. tion	
OSHA anada cordir 1 Cla	her haza A HCS 201 a ng to: WH assificati	rds 2 MIS 2015	ne su	Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproductiv	ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici	and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1	ontainer in point relea ptoms are tions (29 onsidered	n accorda ises metal e shivering CFR 1910 hazardou	llic oxide , fever, 1 0.1200 - s.	s which m malaise ai Hazard Co	nay cause nd muscul ommunica	metal fu ar pain. tion	
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						÷			· · .			÷	:
		· :		Suspecte		or asthma ng cance ging ferti	a symptor r. lity or the	unborn ch	nild.		1		
•	·:.			May form Heating a	combusti bove the i	ble dust o melting p	concentra oint relea	tions in ai ses metal	ir. Iic oxide	s which m	nay cause nd muscula		ıme
Preca	autionar	y statem	ents										
÷	:::	Preve	ntion •	Do not ha	ecial instr ndle until eathe dust	all safety	precautio	ns have b	een rea	d and und	lerstood.		
				Wear prot	it, dřink or ated work	smoke v clothing ves/prote	vhen usin should no ective clot	ot be allow hing/eye p	ved out o protectio	n/face pro	<place. tection.</place. 		
	·1.	Resp	onse •	If experient IF ON SK	ncing resp IN: Wash	with pler	mptoms: ty of wate	Call a PC er.	DIŚÓŃ C	ENTER/d	r breathing loctor.	I. (;;)	
÷:.	:::	<u> </u>	÷	If skin irrit	contaminat ation or ra	ted clothi ash occui	ng and wa rs: Get me	ash it befo edical adv	re reuse ice/atter	e. ntion.		in and long	~~
				if present If eye irrit		to do. Co ists: Get erned: G	ontinue rir medical a et medica	nsing. Idvice/atte I advice/a	ention.		nove conta		25,
11	Sto	orage/Dis	posal •		of content	and/or co tions.	ontainer ir	accordar	nce with	local, reg	ional, natio	onal, an	d/or
2.3 Ot	her haz	ards											
ŴHN	AIS 2015		•	In Canada Workplac							under the		

Section 3 - Composition/Information on Ingredients												
3.1 Substances	:	111	· .	:	111		: • •	111		; · ·	1:1	•

Material does not meet the criteria of a substance.

3.2 Mixtures

			Comp	position	
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Cobalt (powder)	CAS:7440-48-4 EC Number:231- 158-0 EU Index:027- 001-00-9	35% TO 65%	Ingestion/Oral-Rat LD50 • 6171 mg/kg	EU CLP: Annex VI, Table 3.1: Resp. Sens. 1, H334; Skin Sens. 1, H317; Aquatic Chronic 1, H410 (M=1) UN GHS Revision 3: Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl); Aquatic Acute 2; Aquatic Chronic 2 OSHA HCS 2012: Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl) WHMIS 2015: Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1;	NDA
	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl)	1.1
				EU CLP: Annex VI, Table 3.1: Skin Sens. 1, H317;	

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					·							
14 14	CAS :7440-02-0	11			Orl/Der UN GH	rmal/Inhl); IS Revisio	hl); STOT R Aquatic Chr o n 3: Flam. 2 (Inhl); STC	onic 3, H Sol. 1; Re	412 esp. Sens. 1			
Nickel, massive, ≥ 1 mm	EC Number:231-	0% TO 50%	NDA		Aquation OSHA	c Acute 3; HCS 2012	Aquatic Ch Flam. Sol. ens: 1'A; Ca	ironic 3 . 1; Comb	. Dust; Res	p.	NDA	
				1.1	(Lungs WHMIS	, / Orl, Inhl) S 2015: Fl		Comb. Di	ust; Resp. S	ens.		
	CAS: 7440-47-3				Orl, Inh	nl) P: Not Cla	seified				11	
Chromium, massive	EC Number:231- 157-5	15% TO 40%	NDA		UN GH OSHA	IS Revisio	n 3: Not Cl Comb. Du		· . :	• •	NDA	
Molybdenum (powder)	CAS: 7439-98-7 EC Number:231- 107-2	0% TO 30%	NDA	:	Aquatio UN GH Aquatio OSHA	c Chronic 4 \$ Revisio c Chronic 4	n 3; Flam.	Sol. 1; R	epr. 2 (Orl);	; • •	NDA	
							lam. Sol. 1;				÷	
Tungsten, powder	CAS: 7440-33-7 EC Number:231- 143-9	0% TO 25%	NDA		H361fd UN GH (Orl)	l (Orl); EUI IS Revisio	Sol. 1, H228; H029 o n 3: Flam. :: Flam. Sol	Sol. 1; Se	elf-heat. 2; I	Repr. 2	NDA	
1 1 1 1 1 1 1	CAS: 7440-25-7						lam, Sol. 1; Fox. 4, H302		. 2; Repr. 2	(Orl) , , ,		
Tantalum	EC Number:231- 135-5	0% TO 15%	NDA		UN GH OSHA	IS Revisio HCS 2012	n 3: Acute Acute Tox cute Tox. 4	Tox. 4 (0 x. 4 (Orl);	Comb. Dus	st	NDA	
Iron	CAS: 7439-89-6 EC Number:231- 096-4	0% TO 10%			UN GH Chronic OSHA	IS Revisio c 4 HCS 2012	Tox. 4, H302 on 3: Acute :: Acute To: cute Tox. 4	Tox. 4 (0 x. 4 (Orl)	Drl); Aquati		NDA	
Aluminum powder, stabilized	CAS:7429-90-5 EC Number:231- 072-3	0% TO 6%	NDA		-react. UN GH STOT I OSHA	2, H261 IS Revisio RE 1 (Lung HCS 2012	VI, Table 3. n 3: Flam. gs / Inhl); :: Flam. Sol (Lungs / Inh	Sol. 1; W . 1; Wate	ater-react.	2;	NDA	
··· · · · · · · · · · · · · · · · · ·	CAS :7440-32-6	0%			STOT I	RE 1 (Lung P: Pyr. So		1.1	act. 2; Com	b. Dust;		
Titanium, massive	EINECS:231- 142-3	ТО 5%	NDA		OSHA	HCS 2012	r. Sol. 1; Col.	1; Comb.			NDA	
Silicon	CAS :7440-21-3 EC Number: 231- 130-8	0% TO 5%	Ingestior LD50 • 3		t EU CLI UN GH	P: Flam. S IS Revisio	ol. 2, H228 n 3: Flam. : Flam. Sol.	Sol. 2; A		(Orl)	NDA	
Niobium	CAS:7440-03-1 EC Number:231- 113-5	0% TO 3%	NDA		UN GH OSHA	HCS 2012	assified n 3: Not Cl : Not Class ot Classified	sified			NDA	
1.0		1.1		,	EU CLI	P: Flam. S	Sol. 2, H228; RE 1 (CNS	Eye Irrit.		epr. 2,		_

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Cobalt	Based	Alloys	
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		: : :			11.	
Manganese (powder)	CAS: 7439-96-5 EC Number:231- 105-1	0% TO 3%	Ingestion/Oral-Rat LD50 • 9 g/kg	UN GHS Revision 3: Flam. Sol. 2; Skin Irrit. 3; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs/ Inhl) OSHA HCS 2012: Flam. Sol. 2; Skin Irrit. 3; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs/ Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever	NDA	· : .
tit ei				WHMIS 2015: Flam. Sol. 2; Skin Irrit. 3; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs/ Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever	111	· :
Carbon (animal or vegetable origin)	CAS: 7440-44-0 EC Number: 231- 153-3	0% TO 3%	NDA	EU CLP: Not Classified UN GHS Revision 3: Pyr. Sol. 1 OSHA HCS 2012: Pyr. Sol. 1; Comb. Dust WHMIS 2015: Pyr. Sol. 1; Comb. Dust	NDA	: • :
∵ : Vanadium	CAS :7440-62-2 EC Number:231- 171-1	0% TO 2%	NDA	EU CLP: Aquatic Chronic 3, H412 UN GHS Revision 3: Aquatic Acute 3; Aquatic Chronic 3 OSHA HCS 2012: Not Classified WHMIS 2015: Not Classified	j.≓ NDA	· · ·
Hafnium	CAS: 7440-58-6 EINECS: 231- 166-4	0% TO 2%	NDA	EU CLP: Eye Irrit. 2 UN GHS Revision 3: Eye Irrit. 2; Skin Irrit. 3 OSHA HCS 2012: Comb. Dust; Eye Irrit. 2 WHMIS 2015: Comb. Dust; Eye Irrit. 2	NDA	·:.

See Section 16 for full text of H-statements.

Section 4 - First Aid Measures

4.1 Description o	f first aid i	measures	tet etc.	:**			: • •		· .
Inhalation Skin		Move victim to fresh oxygen if breathing i Wash skin with soap	s difficult. If signs	/symptom	s contin	ue, get me	edical atte	ntion.	
Eye Ingestion		In case of contact wi least 20 minutes. If e Rinse mouth. Do not attention if symptom	eye irritation pers t give anything by	ists: Get m	edical a	dvice/atte	ntion.	1.1	i i i
4.2 Most importa	nt sympto	ms and effects,	both acute an	d delay	əd				
	•	Refer to Section 11 -	- Toxicological Inf	ormation.			: * *	11	
4.3 Indication of a	any imme	diate medical atte	ention and sp	ecial tre	atmer	nt neede	d		
Notes to Physician		All treatments should patient. Consideratio other than this produ	on should be give	n to the po					als
Section 5 - Firefi	ghting Me	asures			1 1				
5.1 Extinguishing	j media								
Suitable Extinguishi	ng Media •	Use dry powder extin	nguishing agent.			· .		111	· · · ·
Unsuitable Extinguis Media	hing •	No data available							
5.2 Special hazar	ds arising	from the substa	ance or mixtu	re	÷	: 1		÷	: • :
Unusual Fire and Ex Hazards	plosion •	Metal powder disper Molten metal can igr Molten metal will rea	nite combustibles	<u> </u>	d explo	sion.			

Cobalt Based Alloys												
		1.	:::					÷				: - :
Hazardous Com Products	nbustion	•	No data a	vailable								
5.3 Advice fo	r firefigh	ters	1.			1.						
	-	•	Wear pos Structural	itive press firefighte	sure self rs' protec	-contained	breathing	i apparat y provide	tus (SCBA e limited p). rotection.		
	111			:	111		:**	111			111	-
Section 6 - A	Accidenta	al Rele	ease Me	asures								
6.1 Personal	precauti	ions r	orotectiv	e equir	oment	and em	ergency	nroce	dures			
Personal Preca	-	•	Ventilate				• •	-		ar annro	nriata	
		•	personal	protective	equipme		direct con	tact. Do	not touch			ers
Emergency Pro	cedures	•		an immed	diate pre	cautionary	/ measure	, isolate	arks or flan spill or lea nk truck is	k area foi	r at least	
		11	ISOLATE	fòr 800 ń	neters (1	/2 mile) in	all direction	ons; also	, consider	initial eva	in a life, icuation	for
6.2 Environm	nental pr	ecauti	ions									
	· · · ·		Avoid run	off to wat	erways a	and sewer	S.		:::			
6.3 Methods	and mat	erial f	or conta	inment	and cl	eaning	up					
Containment/Cl Measures	lean-up	•	Where po Residue f	ot material ossible allo rom cuttin	l should ow molte	be picked n materia ding shou	to solidify	/ natural	ly. uumed an	d placed i	n suitabl	le
hi di	;		Dust depo	n nonspar osits shou	Id not be	s to collec e allowed are releas	to accumu	late on s	surfaces, a phere in si	as these n ufficient	nay form	· : . 1
		÷		tion. Avoi					aring dust		with	
6.4 Reference	e to othe	er sect	ions									
		•	Refer to S Considera		- Exposu	ire Contro	ls/Persona	al Protec	tion and S	ection 13	- Dispos	sal

Section 7 - Handling and Storage

	Handli	ng		•	Under normal conditions, exposure to cast ingots presents few health hazards in
:				÷.,	itself. Ingots may be heavy. Use proper material handling equipment to reduce the risks of strains and sprains. Do not place any part of the body where it might be struck by or caught between the ingot and another object. Thermal cutting and melting
			• •		of ingots may produce fumes and dust containing the component elements which may present potentially significant health hazards. Use only with adequate ventilation. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing
	· · ·	•	:	11	operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. To avoid possible explosion, ingots need to be clean and dry when loaded into molten metal or preferably loaded into an empty furnace. Nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, an
:	÷	:::	:.:	÷.,	extremely toxic gas. Cobalt causes a dermatitis of the allergic sensitivity type at points in friction. Cobalt toxicity also results in a progressive diffuse, interstitial pneumonia with a non-productive cough, dyspnea on exertion, interstitial fibrosis and
	<u>.</u>				cell damage. Other workers have experienced a sensitized respiratory disease characterized by cough, wheezing and shortness of breath where upon removal from the environment, the symptoms subside. Wear appropriate personal protective

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equipment, avoid direct contact. Do not breathe dust or fumes. Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

Store in a well-ventilated place. Keep container tightly closed. Keep away from incompatible materials.

7.3 Specific end use(s)

• Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

•

8.1 Control parameters

			Exposure Limits	s/Guidelines		
	Result	ACGIH	Europe	NIOSH	OSHA	United Kingdom
	STELs	Not established	Not established	3 mg/m3 STEL	Not established	1.5 mg/m3 STEL (calculated)
Manganese (powder)	TWAs	0.02 mg/m3 TWA (respirable fraction); 0.1 mg/m3 TWA (inhalable fraction)	Not established	1 mg/m3 TWA (fume)	Not established	0.5 mg/m3 TWA (as Mn)
	Ceilings	Not established	Not established	Not established	5 mg/m3 Ceiling (fume)	Not established
Tantalum	STELs	Not established	Not established	10 mg/m3 STEL (dust)	Not established	10 mg/m3 STEL
(7440-25-7)	TWAs	Not established	Not established	5 mg/m3 TWA (dust)	5 mg/m3 TWA	5 mg/m3 TWA
Aluminum powder, stabilized	STELs	Not established	Not established	Not established	Not established	30 mg/m3 STEL (calculated, inhalable dust); 12 mg/m3 STEL (calculated, respirable dust)
(7429-90-5)	TWAs	1 mg/m3 TWA (respirable fraction)	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)	10 mg/m3 TWA (inhalable dust); 4 mg/m3 TWA (respirable dust)
Nickel, massive, ≥	STELs	Not established	Not established	Not established	Not established	1.5 mg/m3 STEL (calculated)
1 mm (7440-02-0)	TWAs	1.5 mg/m3 TWA (inhalable fraction)	Not established	0.015 mg/m3 TWA	1 mg/m3 TWA	0.5 mg/m3 TWA
Silicon	STELs	Not established	Not established 🔆	Not established	Not established	30 ppm STEL (calculated, inhalable dust); 12 mg/m3 STEL (calculated, respirable dust)
(7440-21-3)	TWAs	Not established	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)	10 mg/m3 TWA (inhalable dust); 4 mg/m3 TWA (respirable dust)
Tungsten, powder	STELs	10 mg/m3 STEL	Not established	10 mg/m3 STEL	Not established	10 mg/m3 STEL
(7440-33-7)	TWAs	5 mg/m3 TWA	Not established	5 mg/m3 TWA	Not established	5 mg/m3 TWA
	• •			0.05 mg/m3 Ceiling		

Cobalt	Based	Alloys

Ceilings	Not established	Not established	(except Vanadium metal and Vanadium carbide, dust and fume, as V, 15 min)	0.5 mg/m3 Ceiling (respirable dust, as V2O5); 0.1 mg/m3 Ceiling (fume, as	Not established	1::
			as Vanadium compounds	V2O5)		· : .
STELs	Not established	Not established	3 mg/m3 STEL (listed under Ferrovanadium dust)	Not established	Not established	
TWAs	Not established	Not established	1 mg/m3 TWA (listed under Ferrovanadium dust)	Not established	Not established	
TWAs	0.5 mg/m3 TWA	Not established	0.5 mg/m3 TWA	0.5 mg/m3 TWA	Not established	
TWAs	10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)	Not established	Not established	Not established	Not established	· : .
TWAs	0.5 mg/m3 TWA	2 mg/m3 TWA	0.5 mg/m3 TWA	1 mg/m3 TWA	0.5 mg/m3 TWA	: • :
STELs	Not established	Not established	Not established	Not established	1.5 mg/m3 STEL (calculated)	
STELs	Not established	Not established	Not established	Not established	0.3 mg/m3 STEL (calculated)	:.
TWAs	0.02 mg/m3 TWA	Not established	0.05 mg/m3 TWA (dust and fume)	0.1 mg/m3 TWA (dust and fume)	0.1 mg/m3 TWA	
	STELS TWAS TWAS TWAS STELS STELS	TWAsNot establishedTWAs0.5 mg/m3 TWATWAs10 mg/m3 TWATWAs10 mg/m3 TWATWAs0.5 mg/m3 TWATWAs0.5 mg/m3 TWASTELsNot establishedSTELsNot established	STELsNot establishedNot establishedTWAsNot establishedNot establishedTWAs0.5 mg/m3 TWANot establishedSTELsNot establishedNot establishedSTELsNot establishedNot established	CeilingsNot establishedNot establishedmetal and Vanadium carbide, dust and fume, as V, 15 min)STELsNot establishedNot established3 mg/m3 STEL (listed under Ferrovanadium dust)TWAsNot establishedNot established1 mg/m3 TWA (listed under Ferrovanadium dust)TWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWATWAs10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)Not established0.5 mg/m3 TWATWAs0.5 mg/m3 TWA2 mg/m3 TWA0.5 mg/m3 TWATWAs0.5 mg/m3 TWA2 ng/m3 TWA0.5 mg/m3 TWATWAs0.5 mg/m3 TWANot establishedNot establishedTWAs0.5 mg/m3 TWA2 ng/m3 TWA0.5 mg/m3 TWATWAs0.02 mg/m3 TWANot establishedNot establishedTWAs0.02 mg/m3 TWANot established0.05 mg/m3 TWA	CeilingsNot establishedNot establishedmetal and Vanadium carbide, dust and fume, as V, 15 min)0.5 mg/m3 Ceiling (respirable dust, as V2O5); 0.1 mg/m3 Ceiling (fume, as V2O5); 0.1 mg/m3 Ceiling (fume, as V2O5); 0.1 mg/m3 Ceiling (fume, as V2O5)STELsNot establishedNot established3 mg/m3 STEL (listed under Ferrovanadium dust)Not establishedTWAsNot establishedNot established1 mg/m3 TWA (listed under Ferrovanadium dust)Not establishedTWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWA0.5 mg/m3 TWATWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWA0.5 mg/m3 TWATWAs0.5 mg/m3 TWANot establishedNot establishedNot establishedTWAs0.5 mg/m3 TWA2 mg/m3 TWA0.5 mg/m3 TWA1 mg/m3 TWATWAs0.5 mg/m3 TWA2 mg/m3 TWA0.5 mg/m3 TWA1 mg/m3 TWATWAs0.5 mg/m3 TWANot establishedNot establishedNot establishedTWAs0.5 mg/m3 TWANot establishedNot establishedNot establishedTWAs0.0 mg/m3 TWANot establishedNot establishedNot establishedTWAs0.1 mg/m3 TWANot establishedNot established0.1 mg/m3 TWA (dust	CeilingsNot establishedNot establishedmetal and Vanadium carbide, dust and fume, as V, 15 min)0.5 mg/m3 Ceiling (respirable dust, as V2O5): 0.1 mg/m3 Ceiling (fume, as V2O5): 0.1 mg/m3 Ceiling (fume, as V2O5)Not establishedSTELsNot establishedNot established3 mg/m3 STEL (listed under Ferrovanadium dust)Not establishedNot establishedTWAsNot establishedNot established1 mg/m3 TWA (listed under Ferrovanadium dust)Not establishedNot establishedTWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWA0.5 mg/m3 TWANot establishedTWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWANot establishedNot establishedTWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWANot establishedNot establishedTWAs0.5 mg/m3 TWANot established0.5 mg/m3 TWA0.5 mg/m3 TWANot establishedTWAs0.5 mg/m3 TWANot establishedNot establishedNot establishedNot establishedTWAs0.5 mg/m3 TWA2 mg/m3 TWA0.5 mg/m3 TWA1 mg/m3 TWA0.5 mg/m3 TWATWAs0.5 mg/m3 TWANot establishedNot establishedNot established0.5 mg/m3 TWATWAs0.5 mg/m3 TWA2 mg/m3 TWA0.5 mg/m3 TWA1 mg/m3 TWA0.5 mg/m3 TWASTELsNot establishedNot establishedNot establishedNot established0.3 mg/m3 STELSTELsNot establishedNot establishedNot establishedNot established0.3 mg/m3 STEL </td

8.2 Exposure controls

Engineering Measures/Controls	••••••	Use a local exhaust when cutting, grinding, welding, or melting. It is recommended that dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an
14 - 141 		explosion supression system or an oxygen-deficient environment. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is not leakage from the equipment). Use only appropriately classified electrical equipment.
Personal Protective	Equipment	
Respiratory	•	For limited exposure, use P95 or N95 respirator. For prolonged exposure use an air-

Eye/Face
Skin/Body..Environmental Exposure
Controls...Follow best practice for site management and disposal of waste. Controls should be
engineered to prevent release to the environment, including procedures to prevent
spills, atmospheric release and release to waterways..Key to abbreviations
ACGIH = American Conference of Governmental Industrial HygieneSTEL = Short Term Exposure Limits are based on 15-minute exposures

NIOSH = National Institute of Occupational Safety and Health OSHA = Occupational Safety and Health Administration

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical Form	Solid	/	Appearance/Description		Metallic gray solid with no odor.		
Color	Metallic gray.		Ddor	Odorless			
Odor Threshold	Data lacking						
General Properties	•				•		
Boiling Point	Data lacking		Melting Point/Freezing	p Point	2700 °F(1482.2222	°C)	
Decomposition Temperature	Data lacking		рН		Data lacking		
Specific Gravity/Relative Density	= 8 Water=1	\	Nater Solubility	Negligible < 0.1 %			
Viscosity	Data lacking		Explosive Properties		Data lacking		1.1
Oxidizing Properties:	Data lacking						, , ,
Volatility	-						
Vapor Pressure	Data lacking	`	/apor Density		Data lacking		
Evaporation Rate	Data lacking		/olatiles (Wt.)	111 I.	0 %	: • •	1.1
Volatiles (Vol.)	0 %						
Flammability							
Flash Point	Data lacking		JEL :		Data lacking		÷
LEL	Data lacking	/	Autoignition		Data lacking		
Flammability (solid, gas)	Data lacking						
Environmental					· · ·		
Octanol/Water Partition coefficient							

9.2 Other Information

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· •	No additional	nhysical and	1 chemical	parameters noted.		
		physical and		purumeters noteu.		

Section 10: Stability and	Reactivity		4.		1.1	4.			1. 1	
10.1 Reactivity	 No dangerou 	us reacti	on knov	vn under	conditions	of norm	al use.			
10.2 Chemical stability										
	Stable under	⁻ normal	temper	atures ar	nd pressure	s.				
10.3 Possibility of hazard	ous reaction	ns		· .	111			1.1.	1:1	
	• Hazardous p	olymeri	zation w	/ill not oc	cur.					
10.4 Conditions to avoid			÷	:-:		÷			÷	
	Avoid generation									
10.5 Incompatible materia	als ,					· . :			1.1	÷.,
	Cast Ingot is acids, bases	stable a	at ordina	ary tempe	erature, how	vever, c	aution sho	ould be tak		
10.6 Hazardous decompo	osition prod	ucts								
national and tai	Under norma itself. Therm component e	al cuttin	g and m	elting of	ingots may	[,] produc	e fumes c	ontaining	the	•
	health hazar	ds.	÷		1.1				÷	11
Section 11 - Toxicologica	al Informatio	n, ,								

11.1 Information on toxicological effects

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		Components
Nickel, massive, ≥ 1 mm (0% TO 50%)	7440 -02- 0	Acute Toxicity: Ingestion/Oral-Rat TDLo • 200 mg/kg; Nutritional and Gross Metabolic: Gross Metabolite Changes:Weight loss or decreased weight gain; Behavioral:Somnolence (general depressed activity); Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 500 mg/kg 5 Day(s)-Intermittent; Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Related to Chronic Data:Death in the Other Multiple Dose data type field; Inhalation-Rabbit TCLo • 1 mg/m ³ 6 Hour(s) 13 Week(s)-Intermittent; Lungs, Thorax, or Respiration:Other changes; Lungs, Thorax, or Respiration:Changes in lung weight; Blood:Hemorrhage; Inhalation-Rat TCLo • 0.4 mg/m ³ 40 Week(s)-Intermittent; Vascular:Thrombosis distant from injection site; Lungs, Thorax, or Respiration:Other changes; Related to Chronic Data:Death in the Other Multiple Dose data type field; Reproductive: Ingestion/Oral-Rat TDLo • 158 mg/kg (multigenerations); Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus); Reproductive Effects:Effects on Embryo or Fetus:Fetal death; Tumorigen / Carcinogen: Inhalation-Guinea Pig TCLo • 15 mg/m ³ 91 Week(s)-Intermittent; Tumorigenic:Equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration:Tumors; Lungs, Thorax, or
Manganese (powder) (0% TO 3%)	7439 -96- 5	Acute Toxicity: Ingestion/Oral-Rat LD50 • 9 g/kg; Irritation: Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Multi-dose Toxicity: Inhalation-Human TCLo • 0.5 mg/m³ 39 Week(s)-Intermittent; <i>Brain and Coverings</i> :Other degenerative changes; <i>Peripheral Nerve and Sensation</i> :Sensory change involving peripheral nerve; <i>Behavioral</i> :Irritability; Inhalation-Mouse TCLo • 0.7 mg/m³ 24 Hour(s) 22 Week(s)-Continuous; <i>Lungs, Thorax, or</i> <i>Respiration</i> :Fibrosis (interstitial); <i>Immunological Including Allergic</i> :Decrease in cellular immune response; Inhalation-Rat TCLo • 0.3 mg/m³ 5 Hour(s) 26 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration</i> :Fibrosis (interstitial); <i>Immunological Including Allergic</i> :Decrease in cellular immune response; Inhalation-Rat TCLo • 0.3 mg/m³ 5 Hour(s) 26 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration</i> :Fibrosis (interstitial); <i>Immunological Including Allergic</i> :Decrease in cellular immune response; Reproductive: Ingestion/Oral-Mouse TDLo • 322.5 mg/kg (43D male); <i>Reproductive Effects:Paternal</i> <i>Effects</i> :Spermatogenesis; Ingestion/Oral-Rat TDLo • 50 mg/kg (20D post); <i>Reproductive Effects:Specific</i> <i>Developmental Abnormalities</i> :Central nervous system; <i>Reproductive Effects:Effects on Newborn</i> :Biochemical and metabolic; <i>Reproductive Effects:Effects on Newborn</i> :Growth statistics (e.g., reduced weight gain); <i>Reproductive</i> <i>Effects:Effects on Newborn</i> :Biochemical and metabolic; <i>Reproductive Effects:Effects on Newborn</i> :Other postnatal measures or effects
ītanium, nassive (0% [™] O 5%)	7440 -32- 6	Reproductive: Ingestion/Oral-Rat TDLo • 158 mg/kg (multigeneration); Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus); Reproductive Effects:Effects on Embryo or Fetus:Fetal death
Cobalt (powder) (35% FO 65%)	7440 -48- 4	Acute Toxicity: Ingestion/Oral-Rat LD50 • 6171 mg/kg; <i>Behavioral</i> :Somnolence (general depressed activity); <i>Behavioral</i> :Ataxia; <i>Gastrointestinal</i> :Hypermotility, diarrhea; Multi-dose Toxicity: Inhalation-Rabbit TCLo • 10 mg/m ³ 2 Hour(s) 56 Day(s)-Intermittent; <i>Behavioral</i> :Food intake (animal); <i>Lungs, Thorax, or Respiration</i> :Emphysema; <i>Liver</i> :Fatty liver degeneration; Inhalation-Rat TCLo • 0.09 mg/m ³ 24 Hour(s) 8 Week(s)-Continuous; <i>Lungs, Thorax, or Respiration</i> :Other changes; <i>Kidney, Ureter, and Bladder</i> :Urine volume decreased; <i>Biochemical</i> :Enzyme inhibition, induction, or change in blood or tissue <i>levels</i> :Dehydrogenases; Inhalation-Rat TCLo • 2 mg/m ³ 4 Day(s)-Intermittent; <i>Lungs, Thorax, or Respiration</i> :Fibrosing alveolitis
Aluminum bowder, stabilized (0% FO 6%)	7429 -90- 5	Multi-dose Toxicity: Inhalation-Man TCLo • 4 mg/m ³ 1 Year(s)-Intermittent; <i>Lungs, Thorax, or Respiration</i> :Cough; <i>Lungs, Thorax, or Respiration</i> :Dyspnea; <i>Nutritional and Gross Metabolic:Gross Metabolite Changes</i> :Weight loss or decreased weight gain; Inhalation-Rat TCLo • 206 mg/m ³ 5 Hour(s) 30 Day(s)-Intermittent; <i>Lungs, Thorax, or</i> <i>Respiration</i> :Fibrosis (interstitial); <i>Endocrine</i> :Hypoglycemia; <i>Blood</i> :Changes in serum composition (e.g., TP, bilirubin cholesterol)
		Irritation: Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation;
owder (0%	7440 -33- 7	Reproductive: Ingestion/Oral-Rat TDLo • 1160 µg/kg (30W pre/1-20D preg); <i>Reproductive Effects:Specific Developmental Abnormalities</i> : Musculoskeletal system ; Ingestion/Oral-Rat TDLo • 1210 µg/kg (35W pre); <i>Reproductive Effects:Effects on Fertility</i> : Post-implantation mortality ; <i>Reproductive Effects:Specific Developmental Abnormalities</i> : Musculoskeletal system
Tungsten, bowder (0% TO 25%) Tantalum (0% TO 15%)	-33-	Developmental Abnormalities: Musculoskeletal system; Ingestion/Oral-Rat TDLo • 1210 µg/kg (35W pre); Reproductive Effects: Effects on Fertility: Post-implantation mortality; Reproductive Effects: Specific Developmental

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Vanadium (0% TO 2%)	7440 -62- 2	Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 225 mg/kg 15 Day(s)-Continuous; <i>Nutritional and Gross</i> Metabolic:Gross Metabolite Changes:Weight loss or decreased weight gain
Iroņ (0% TO 10%)	7439 -89- 6	Acute Toxicity: Ingestion/Oral-Rat LD50 • 750 mg/kg; <i>Blood</i> :Changes in serum composition (e.g., TP, bilirubin cholesterol); <i>Biochemical:Enzyme inhibition, induction, or change in blood or tissue</i> <i>leve/s</i> :Transaminases; Ingestion/Oral-Child TDLo • 77 mg/kg; <i>Behavioral</i> :Irritability; <i>Gastrointestinal</i> :Nausea or vomiting; <i>Blood</i> :Normocytic anemia; Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 105 mg/kg 5 Week(s)-Continuous; <i>Liver</i> :Tumors; <i>Tumorigenic</i> :Active as anti-cancer agent; <i>Tumorigenic</i> :Protects against induction of experimental tumors
Molybdenum (powder) (0% TO 30%)	7439 -98- 7	Mutagen: Cytogenetic analysis • Inhalation-Rat • 19500 µg/m ³ ; Reproductive: Ingestion/Oral-Mouse TDLo • 448 mg/kg (multigenerations); <i>Reproductive Effects:Effects on Embryo or</i> <i>Fetus</i> :Fetotoxicity (except death, e.g., stunted fetus); <i>Reproductive Effects:Effects on Embryo or Fetus</i> :Fetal death; Ingestion/Oral-Rat TDLo • 5800 µg/kg (30W pre/1-20D preg); <i>Reproductive Effects:Specific Developmental</i> <i>Abnormalities</i> :Musculoskeletal system; Ingestion/Oral-Rat TDLo • 6050 µg/kg (35W pre); <i>Reproductive Effects:Effects</i> <i>on Fertility</i> :Pre-implantation mortality; <i>Reproductive Effects:Effects on Fertility</i> :Post-implantation mortality; <i>Reproductive Effects:Specific Developmental Abnormalities</i> :Musculoskeletal system

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GHS Properties			Classification			
			EÚ/CLP • Data lacking UN GHS 3 • Data lacking		÷	:
Acute toxicity			OSHA HCS 2012 • Data lacking			
	1.1		WHMIS 2015 • Data lacking		1.1	
			EU/CLP • Data lacking			
Skin corrosion/Irritation			UN GHS 3 • Data lacking			
	1		OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking	: * *	11	
	1.		EU/CLP • Data lacking UN GHS 3 • Eye Irritation 2			
Serious eye damage/Irritation		111	OSHA HCS 2012 • Eye Irritation 2		11.	
			WHMIS 2015 • Eye Irritation 2			
			EU/CLP • Skin Sensitizer 1			
Skin sensitization			UN GHS 3 • Skin Sensitizer 1			
			OSHA HCS 2012 • Skin Sensitizer 1 WHMIS 2015 • Skin Sensitizer 1			
			EU/CLP • Respiratory Sensitizer 1		1	
			UN GHS 3 • Respiratory Sensitizer 1			
Respiratory sensitization			OSHA HCS 2012 • Respiratory Sensitizer 1		÷	
	- i i	i i	WHMIS 2015 • Respiratory Sensitizer 1			
			EU/CLP • Data lacking			
Aspiration Hazard			UN GHS 3 • Data lacking			
•			OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking			
			EU/CLP • Carcinogenicity 2; Suspected of causing cancer			
	11		UN GHS 3 • Carcinogenicity 2	: * *	1:1	
Carcinogenicity			OSHA HCS 2012 • Carcinogenicity 2			
			WHMIS 2015 • Carcinogenicity 2			
			EU/CLP • Data lacking			
Germ Cell Mutagenicity			UN GHS 3 • Data lacking			
			OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking		1.1	
			WTIWIS 2013 • Data lacking			

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Cobalt Based A	Alloys												
													: • :
Toxicity fo	r Reprodu	ction		'ii	UN GI OSHA	HS 3 • Toxi A HCS 201	to Reproduc ic to Reprodu 2 • Toxic to F Foxic to Rep	uction 2 Reproductio	n 2	· · ·	• •		
STOT-SE	•		11	H.	ŰŇ GI OSHA		•	ing		· .			
						-	fic Target Or		Repeate	d Exposure	1; Specific T	arget Org	an [‡]
STOT-RE			<u>[</u> 4]	at.	UŅ GI OSHA	HS 3 • Spe • HCS 201	ed Exposure cific Target (2 • Specific T Specific Targ	Organ Toxic Farget Orga	n Toxicity	Repeated E	xposure 1		
Potentia	l Health	Effect	S										
Inhalatio	n	:			: * *		· • • •	: * *	1:1		: * *	1:1	· · · ·
Acute (Immedia	ite)	•	Processes									
÷			÷	excessive lungs but	reactions	are typi	cally rever	in the wor sible.	kpiace.	Nuisance	dust may		; ;;;
Chroni	c (Delaye	ed)	•	Repeated	and prole	onged ex	kposure ma	ay cause :					n.
			14	Following obstructive respiratory chest X-ra exposure perforation	e lung dis / exposur y, produc to Nickel	ease wit re results ction of s can cau	h wheezin in reduce canty muc ise effects	g, cough, d lung fun coid sputur such as r	and sho iction, in m, and s hinitis, s	rtness of l creased fi shortness sinusitis, n	oreath. Ch brotic cha of breath. asal septa	ironic nges on Chronic al	
		: • •		workers.	13 and a3							ung '	
Skin													
Acute (Immedia	ite)	11.	in human	s include beings.	nay caus redness	e mechan , and skin	ical irritati rash, Con	on. May itact alle	cause sk rgy to nicl	in sensitiz kel is very	ation. commoi	י: ו
Chroni	c (Delaye	∋d)	•	No data a	/ailable.								
Eye												. • •	
Acute (Immedia	ite)	•	Causes se workplace									
Chroni	c (Delaye	ed)	•	No data a	-		-	-	•		,		
Ingestio	n				:								
Acute (Immedia	ite)	•	Excessive irritation to				dust in th	ne workp	lace may	cause me	chanical	
			1.1					1.1	1.		1.1		

No data available.

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- Chronic (Delayed) Carcinogenic Effects
- Repeated and prolonged exposure to fumes and dust created in processing this product may cause cancer.

	· ·	Carcinogenic Effects	
	CAS	IARC	NTP
Nickel, massive, ≥ 1 mm	7440-02-0	Group 2B-Possible Carcinogen	Reasonably Anticipated to be Human Carcinogen
Cobalt (powder)	7440-48-4	Group 2B-Possible Carcinogen	Not Listed

Reproductive Effects

Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.

11.2 Other information

• Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

Key to abbreviations

i i					i.		
Cobalt Base	ed Alloys						
					 ÷		: • :
LD = Letha							
TC = Toxic TD = Toxic	c Concentration						11

Section 12 - Ecological Information

12.1 Toxicity

		Components	
Nickel, massive, ≥ 1 mm (0% TO 50%)	7440-02- 0	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Oncorhynchus mykiss (Rainbow Trout) 0.06 mg/L 28 Day(s) NOEC Cyprinus carpio (Common Carp) 0.0035 µg/L Aquatic Toxicity-Crustacea: 7 Day(s) NOEC Americamysis bahia (Opossum Shrimp) 0.213 mg/L Aquatic Toxicity-Algae and Other Aquatic Plant(s): 96 Hour(s) EC50 Pseudokirchneriella subcapitata (Green Algae) 0.233 mg/L	
Cobalt (powder) (35% TO 65%)	7440-48- 4	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Pimephales promelas (Fathead Minnow) 3.4 mg/L Aquatic Toxicity-Crustacea: 48 Hour(s) LC50 Daphnia magna (Water Flea) 4.4 mg/L 28 Day(s) NOEC Daphnia magna (Water Flea) 0.0028 mg/L	
Vanadium (0% TO 2%)	7440-62- 2	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Pimephales promelas (Fathead Minnow) 1.8 mg/L Aquatic Toxicity-Crustacea: 48 Hour(s) LC50 Daphnia magna (Water Flea) 1.55 mg/L 7 Day(s) NOEC Daphnia magna (Water Flea) 0.5 mg/L	;
Iron (0% TO 10%)	7439-89- 6	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Mudskipper(Periophthalmus waltoni) 0.00648 mg/L 7 Day(s) NOEC Brown Trout (Salmo trutta) 0.305 mg/L Aquatic Toxicity-Crustacea: 7 Day(s) NOEC Aquatic Sowbug, Isopod (Idotea balthica) 0.5 mg/L	
Molybdenum (powder) (0% TO 30%)	7439-98- 7	Aquatic Toxicity-Fish: 96 Hour(s) LC50 <i>Rainbow Trout (Oncorhynchus mykiss)</i> 800 mg/L Aquatic Toxicity-Crustacea: 48 Hour(s) LC50 <i>Daphnia magna (Water Flea)</i> >200 mg/L 28 Day(s) NOEC <i>Daphnia magna (Water Flea)</i> 0.67 mg/L	

• Product in ingot form is non-toxic to aquatic and terrestrial organisms.

12.2 Persistence and degradability

• The product is persistent and would have low degradability.

12.3 Bioaccumulative potential

• Material data lacking.

12.4 Mobility in Soil

• A low mobility would be expected in a landfill situation.

12.5 Results of PBT and vPvB assessment

• No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

• No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treat	ment met	hods		· · · ·	111	11				÷
Product waste			content and/or al regulations.	container i	in accordance	e with loca	l, regional,	national,	and/or	-
Packaging waste	i		content and/or al regulations.	container i	in accordance	e with loca	, regional,	national,	and/or	-: :

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
TDG	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
IMO/IMDG	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
IATA/ICAO	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
user 14.7 Trans according	ial precautions sport in bulk to Annex II of nd the IBC Cod	Data lacking.		e e ei 1 e ei	

	Section	15 - F	Regula	tory Ir	nformat	tion
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15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • Acute, Chronic, Pressure(Sudden Release of)

			Inventory	ta ja sa		
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Aluminum powder, stabilized	7429-90-5	Yes	No	Yes	No	Yes
Carbon (animal or vegetable origin)	7440-44-0	Yes	No	Yes	No	Yes
Chromium, massive	7440-47-3	Yes	No	Yes	No	Yes
Cobalt (powder)	7440-48-4	Yes	No	Yes	No	Yes
Hafnium	7440-58-6	Yes	No	Yes	No	Yes
Iron	7439-89-6	Yes	No .	Yes	No .	Yes
Manganese (powder)	7439-96-5	Yes	No	Yes	No	Yes
Molybdenum (powder)	7439-98-7	Yes	No	Yes	No	Yes
Nickel, massive, ≥ 1 mm	7440-02-0	Yes	No	Yes	No	Yes
Niobium	7440-03-1	Yes	No	Yes	No	Yes
Silicon	7440-21-3	Yes	No	Yes	No	Yes
Tantalum	7440-25-7	Yes	No	Yes	No	Yes
Titanium, massive	7440-32-6	Yes	No	Yes	No	Yes
Tungsten, powder	7440-33-7	Yes	No	Yes	No	Yes
Vanadium	7440-62-2	Yes	No	Yes , ,	No	Yes

Canada

Labor Canada	WHMIS -	Classifica	tions of S	Substances	<u>; . :</u>	 1	1 1 1 1	1 1 1 1 1				; · ;
• Hafniu	n ' <u>; ;</u>						· : -	7440-58-6	accordi	trolled produing to WHMI	S (, ;	

										·
								Uncontrolle	d product	
Carbon (animal or vege	table origin)						7440-44-0	according to		
· · · · · · · · · · · · · · · · · · ·		1.						classificatio		
								Uncontrolle	ed product	
Chromium, massive							7440-47-3	according to		
								classificatio	on criteria	
Manganese (powder)				111		:	7439-96-5	D2A (inclue	ding powd	ler)
								Uncontrolle	ed product	
Tantalum							7440-25-7	according to		
1.1	··· ···			÷			÷	classificatio	on criteria	÷
Cobalt (powder)							7440-48-4	D2A, D2B		
								B6 (powde		
Aluminum powder, stat	oilized			1.1			7429-90-5	product acc		WHMIS
								classificatio		
							7400 00 7	Uncontrolle		
Molybdenum (powder)							7439-98-7	according to		
Nickel massive > 1 mm		· .	:		· · · ·	: * *	7440-02-0	classificatio D2A, D2B;		Danov)
 Nickel, massive, ≥ 1 mm Silicon 	1						7440-02-0 7440-21-3	B4	DU, DZA (Raney)
Silicon							7440-21-3		المعربة مراب	
Tungsten, powder						1.1	7440-33-7	Uncontrolle according to		
rungsten, powder							7440-55-7	classificatio		
Vanadium							7440-62-2	Not Listed		
Vanadiam				1.1			1110 02 2	Uncontrolle	d product	
Iron							7439-89-6	according to		
								classificatio		
Titanium, massive							7440-32-6	Not Listed		
							7440-03-1	Not Listed	: • •	
anada - WHMIS - Ingre	dient Disclos	sure List								
Hafnium			:.:			:.:	7440-58-6	1 %	:.:	÷
Carbon (animal or vege	table origin)						7440-44-0	Not Listed		
 Chromium, massive 							7440-47-3	0.1 %		
Manganese (powder)		1.1		1.1	1.1		7439-96-5	1 %		1.1
Tantalum					i.		7440-25-7	1 %		
Cobalt (powder)							7440-48-4	0.1 %		
Aluminum powder, stab	oilized						7429-90-5	1 %		
Molybdenum (powder)							7439-98-7	1 %		
Nickel, massive, ≥ 1 mm					1.1		7440-02-0	0.1 %		111
Silicon							7440-21-3	Not Listed		
Tungsten, powder							7440-33-7	1 %		
Vanadium		: 1		÷			7440-62-2	1 %		÷
Iron							7439-89-6	Not Listed		
Titanium, massive							7440-32-6	Not Listed		· . :
Niobium		1.	,		1.		7440-03-1	Not Listed		
nvironment										
anada - CEPA - Priorit	y Substances	List	: • •			: * *			: ' '	
Hafnium							7440-58-6	Not Listed		
	table origin)						7440-44-0	Not Listed		
Carbon (animal or vege			1.1	÷		:.:	7440-47-3	Not Listed		÷
Carbon (animal or vege Chromium, massive							7439-96-5	Not Listed	4	
Carbon (animal or vege Chromium, massive										
Carbon (animal or vege Chromium, massive Manganese (powder)							7440-25-7	Not Listed		
 Carbon (animal or vege Chromium, massive Manganese (powder) Tantalum Cobalt (powder) 				1.1			7440-25-7 7440-48-4	Not Listed		1.1

	÷		11.				÷
Molybdenum (powder)					7439-98-7	Not Listed	
Nickel, massive, ≥ 1 mm	1.1	1.1	 1.1	1.1	 7440-02-0	Not Listed	 1.1
Silicon					7440-21-3	Not Listed	
Tungsten, powder					7440-33-7	Not Listed	
Vanadium					7440-62-2	Not Listed	
Iron			 		 7439-89-6	Not Listed	
Titanium, massive	i.				7440-32-6	Not Listed	
Niobium					7440-03-1	Not Listed	

United States

.abor J.S OSHA - Process Safety	Manage	ment - Highl	y Hazard	ous Chei	micals				• •		
Hafnium							7440-58-6	Not Listed			
 Carbon (animal or vegetable o 	rigin)						7440-44-0	Not Listed			
 Chromium, massive 							7440-47-3	Not Listed			
 Manganese (powder) 	111		111	1		111	7439-96-5	Not Listed	: • •	1:1	
• Tantalum							7440-25-7	Not Listed			
 Cobalt (powder) 							7440-48-4	Not Listed			
Aluminum powder, stabilized	÷		1.1	1.			7429-90-5	Not Listed		÷	
 Molybdenum (powder) 							7439-98-7	Not Listed			
Nickel, massive, ≥ 1 mm							7440-02-0	Not Listed			
Silicon	1.1			1.1			7440-21-3	Not Listed	· ·	1.1	
Tungsten, powder							7440-33-7	Not Listed			
• Vanadium							7440-62-2	Not Listed			
• Iron							7439-89-6	Not Listed			
Titanium, massive	11		: * *	11		: * *	7440-32-6	Not Listed	: • •	11	
Niobium							7440-03-1	Not Listed			
.S OSHA - Specifically Reg	ulated C	Chemicals	:.:	÷		:.:	1.	:	:.:	÷	
• Hafnium							7440-58-6	Not Listed			
 Carbon (animal or vegetable or 	rigin)						7440-44-0	Not Listed			
Chromium, massive	1.1			1.1	1		7440-47-3	Not Listed	• •	1.1	
Manganese (powder)							7439-96-5	Not Listed			
Tantalum							7440-25-7	Not Listed			
Cobalt (powder)							7440-48-4	Not Listed			
Aluminum powder, stabilized	1.1		: • •	1.1	. :		7429-90-5	Not Listed	: • •	11	
Molybdenum (powder)							7439-98-7	Not Listed			
Nickel, massive, ≥ 1 mm							7440-02-0	Not Listed			
Şilicon	÷		:.:	÷		:.:	7440-21-3	Not Listed	:.:	÷	
							7440-33-7	Not Listed			
Tungsten, powder							7440-62-2	Not Listed			
•							=				
Vanadium	• . :			1.1	1.1		7439-89-6	Not Listed		1.1	
 Tungsten, powder Vanadium Iron Titanium, massive 				1.1			7439-89-6 7440-32-6	Not Listed Not Listed		1.1	

Environment U.S CAA (Clean Air Act) - 1990 Haza	rdous Air F	Pollutants						1 1 1		
• Hafnium						7440-58-6	Not Listed			
Carbon (animal or vegetable origin)		1.1	÷.		:.:	7440-44-0	Not Listed	:.:	÷.,	
Chromium, massive						7440-47-3	Not Listed			
Manganese (powder)						7439-96-5	Not Listed			
• Tantalum			1.1	1		7440-25-7	Not Listed		1.1	
Cobalt (powder)						7440-48-4	Not Listed			

balt Based Alloys											
Aluminum powder, st	abilized							7429-90-5	Not Listed		
Molybdenum (powde		1.1						7439-98-7	Not Listed		
 Nickel, massive, ≥ 1 n 			1.			1.		7440-02-0			
									Not Listed		
Silicon								7440-21-3	Not Listed		
Tungsten, powder								7440-33-7	Not Listed		
Vanadium	: • •	1.1	. :	: • •	1.1		1.1.1	7440-62-2	Not Listed	: • •	1
Iron								7439-89-6	Not Listed		
Titanium, massive								7440-32-6	Not Listed		
Niobium		÷.,			1.		1.1	7440-03-1	Not Listed	1.1	1.
											÷
S CERCLA/SARA	- Hazard	lous Sul	bstances a	nd their Re	portable	Quantities		7440 50 0	NI (1) (1		
Hafnium			1.1		1.1	1.1		7440-58-6	Not Listed		1.1
Carbon (animal or ve	getable o	rigin)						7440-44-0	Not Listed		
									5000 lb fin		
									of releases		
									substance		
		111	· · · ·	:	111		111		diameter o		
									solid metal		
Chromium, massive								7440-47-3	µm); 2270		
i		1	: · · ·	1.1	÷		1.1	÷	reporting c		
									hazardous		
									required if		
· · · · ·		· . :			1.1			1.1	pieces of th		
									released is	>100 µn	n) -
Manganese (powder)							7439-96-5	Not Listed		
Tantalum								7440-25-7	Not Listed		
Cobalt (powder)								7440-48-4	Not Listed		
Aluminum powder, st	abilized	111		111	111		111	7429-90-5	Not Listed	111	
Molybdenum (powde								7439-98-7	Not Listed		
	- /								100 lb fina	I RO (no	reporting
i	1.1	÷.,		:.:	÷		1.1	1. E.	releases o		
									substance		
									diameter o		
									solid metal		
Nickel, massive, ≥ 1 n	nm '		: .			1.		7440-02-0	µm); 45.4 k		
									reporting c		
									hazardous		
									required if	the diam	eter of the
	111	1.1		: • •	1.1	· • • • •	111	1.1	pieces of the	ne solid r	netal
									released is	>100 µn	n)
Silicon								7440-21-3	Not Listed		
Tungsten, powder	:.:			1.1	÷.,		:.:	7440-33-7	Not Listed	:.:	÷
Vanadium			1 1	1		1 1	1	7440-62-2	Not Listed		
Iron								7439-89-6	Not Listed		
Titanium, massive			1.			1.		7440-32-6	Not Listed		
Niobium								7440-03-1	Not Listed		
S CERCLA/SARA	- Radion	nuclides	and Their	Reportable	Quantiti	es					
Hafnium								7440-58-6	Not Listed		
Carbon (animal or ve		riain)	11.		1.	11.	1	7440-44-0	Not Listed		
Chromium, massive		5						7440-47-3	Not Listed		
Manganese (powder)							7439-96-5			
	/ [.]	÷			÷		1.1		Not Listed		÷
								7440-25-7	Not Listed		
								7440-48-4	Not Listed		
Cobalt (powder)									N = 4 1 ! = 4 = -1		
Cobalt (powder)	abilized	1.1	1.1		1.1	1.1		7429-90-5	Not Listed		1.1
 Tantalum Cobalt (powder) Aluminum powder, st Molybdenum (powde) 								7429-90-5 7439-98-7	Not Listed		

					1.	11.	1	1.	11.		
balt Based Alloys											
								11.			11.
Silicon								7440-21-3	Not Listed		
Tungsten, powder			1.1		1.1	1.1		7440-33-7	Not Listed		1.1
Vanadium								7440-62-2	Not Listed		
Iron								7439-89-6	Not Listed		
Titanium, massive								7440-32-6	Not Listed		
Niobium	;			: • •				7440-32-0	Not Listed	: • •	
	0 11 00						-				
S CERCLA/SARA -	Section 30	J2 EXt		zardous Su				7440-58-6	Not Listed		
	otoblo origi	n)			· · · ·			7440-56-6	Not Listed Not Listed		÷
Carbon (animal or veg	etable origi	(1)						7440-44-0 7440-47-3			
Chromium, massive									Not Listed		
Manganese (powder)								7439-96-5	Not Listed		
Tantalum								7440-25-7	Not Listed		
Cobalt (powder)	ام م ال							7440-48-4	Not Listed		
Aluminum powder, sta								7429-90-5	Not Listed		
Molybdenum (powder)			· · · ·		111			7439-98-7	Not Listed		1:1
Nickel, massive, ≥ 1 mi	m							7440-02-0	Not Listed		
Silicon								7440-21-3	Not Listed		
Tungsten, powder					÷			7440-33-7	Not Listed		÷
Vanadium								7440-62-2	Not Listed		
Iron								7439-89-6	Not Listed		
Titanium, massive Niobium								7440-32-6 7440-03-1	Not Listed Not Listed		1.1
	Section 30	02 Ext	remely Ha	zardous Si	ubstances	s TPQs					
Hafnium			remely Ha	zardous Si	ubstances	s TPQs		7440-58-6	Not Listed		
Hafnium Carbon (animal or veg			remely Ha	zardous Si	ubstances	s TPQs		7440-44-0	Not Listed	;	
Hafnium Carbon (animal or veg Chromium, massive	etable origin		remely Ha	zardous Si	ubstances	s TPQs	1	7440-44-0 7440-47-3	Not Listed Not Listed	;	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder)	etable origin		4.					7440-44-0 7440-47-3 7439-96-5	Not Listed Not Listed Not Listed		
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder)	etable origin		remely Ha	zardous Si	ubstances	s TPQs		7440-44-0 7440-47-3	Not Listed Not Listed	: 	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum	etable origin		4.					7440-44-0 7440-47-3 7439-96-5	Not Listed Not Listed Not Listed Not Listed Not Listed	: :.:	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder)	etable origir		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7	Not Listed Not Listed Not Listed Not Listed	:" 14	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta	etable origin		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4	Not Listed Not Listed Not Listed Not Listed Not Listed	 	191 491 194
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder)	etable origin bilized		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	: :.:	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi	etable origin bilized		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	•*** 9-4 * :	191 441 194
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 m Silicon	etable origin bilized) m		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	атт 1941 1911	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder Nickel, massive, ≥ 1 m Silicon Tungsten, powder	etable origin bilized		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium	etable origin bilized) m		4.				· ··· · : ···	7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	: :.: :	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron	etable origin	n)		····				7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	····	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive	etable origin		4.					7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-02-0 7440-33-7 7440-62-2 7439-89-6	Not Listed Not Listed	····	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA -	etable origin	n)						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed	····	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium	etable origin abilized) m Section 31	n) 13 - En						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed	*** ••• ••• •••	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium	etable origin abilized) m Section 31	n) 13 - En						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed		
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg	etable origin abilized) m Section 31	n) 13 - En						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed		
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive	etable origin abilized) m Section 31	n) 13 - En						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1 7440-58-6 7440-58-6 7440-44-0 7440-47-3	Not Listed Not Listed	inimis on	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive Manganese (powder)	etable origin abilized) m Section 31 etable origin	n) 13 - En						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-03-1 7440-58-6 7440-44-0 7440-47-3 7439-96-5	Not Listed Not Listed	inimis on	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum	etable origin abilized) m Section 31 etable origin	n) 13 - En n)	nission Re	porting				7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-62-2 7439-89-6 7440-32-6 7440-32-6 7440-32-6 7440-58-6 7440-47-3 7439-96-5 7440-25-7	Not Listed Not Listed	inimis on inimis on	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum	etable origin abilized) m Section 31 etable origin	n) 13 - En						7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-03-1 7440-58-6 7440-44-0 7440-47-3 7439-96-5	Not Listed Not Listed	inimis on inimis on	
Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 m Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder)	etable origin abilized) m Section 31 etable origin	n) 13 - En n)	nission Re	porting				7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-32-6 7440-47-3 7440-47-3 7439-96-5 7440-25-7 7440-48-4	Not Listed Not Listed 1.0 % de m concentrati Not Listed 0.1 % de m	inimis on inimis on inimis on inimis	
 S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta Molybdenum (powder) Aluminum powder, sta Molybdenum (powder) Nickel, massive, ≥ 1 mi Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium S CERCLA/SARA - Hafnium Carbon (animal or veg Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, sta 	etable origin abilized) m Section 31 etable origin	n) 13 - En n)	nission Re	porting				7440-44-0 7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-62-2 7439-89-6 7440-32-6 7440-32-6 7440-32-6 7440-58-6 7440-47-3 7439-96-5 7440-25-7	Not Listed Not Listed 1.0 % de m concentrati Not Listed 0.1 % de m	inimis on inimis on inimis on inimis	

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							7440-33-7	Not Listed		
							7440.00.0	1.0 % de mi		
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							7439-89-6	Not Listed		
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							7440-03-1	Not Listed		
Section 31	3 - PBT (Chemical Li	isting							
					1.		7440-58-6	Not Listed		
atable origin)						7440-44-0	Not Listed		
							7440-47-3	Not Listed		
							7439-96-5	Not Listed		
							7440-25-7	Not Listed		1
							7440-48-4	Not Listed		
bilized							7429-90-5	Not Listed		
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							7440-00-1	NOT LISTED		
lifornia		:	:.:			:.:	1.			
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osition 65 -	Carcine	ogens List								
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atable origin)						7440-44-0	Not Listed		
							7440-47-3	Not Listed		
							7439-96-5	Not Listed		
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							7440-48-4		7/1/1992	
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							7439-98-7			
n							7440-02-0	•	10/1/1989	1
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							7440-21-3	Not Listed		
							7440-33-7	Not Listed		
							7440-62-2	Not Listed		
							7439-89-6	Not Listed		
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sition 65 -	Develo	pmental To	xicity				7440-32-6	Not Listed Not Listed		
sition 65 -	Develo	pmental To	xicity	111 41	-4. 1	:	7440-32-6 7440-03-1	Not Listed Not Listed		
		pmental To	xicity				7440-32-6 7440-03-1 7440-58-6	Not Listed Not Listed Not Listed	:.: ·:	÷
osition 65 - etable origin		pmental To	xicity				7440-32-6 7440-03-1	Not Listed Not Listed	:.: ·:	
	Section 313 etable origin bilized n lifornia osition 65 - etable origin bilized	Section 313 - PBT (etable origin) bilized n lifornia psition 65 - Carcino etable origin)	Section 313 - PBT Chemical Li etable origin) bilized lifornia section 65 - Carcinogens List etable origin) bilized	Section 313 - PBT Chemical Listing etable origin) Dilized Disition 65 - Carcinogens List etable origin)	Section 313 - PBT Chemical Listing	Section 313 - PBT Chemical Listing etable origin) bilized a bilized bilized	Section 313 - PBT Chemical Listing etable origin)	Section 313 - PBT Chemical Listing 7440-58-6 stable origin) 7440-44-0 7440-47-3 7439-96-5 7440-48-4 7429-90-5 7440-21-3 7440-22-0 7440-33-7 7440-62-2 7440-32-6 7440-32-6 7440-03-1 7440-58-6 1 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-6 7440-65-7 7440-58-7 7440-65-7 7440-58-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7 7440-45-7	Section 313 - PBT Chemical Listing 7440-58-6 Not Listed stable origin) 7440-58-6 Not Listed 7440-44-0 Not Listed 7440-44-0 7440-44-0 Not Listed 7440-47-3 7440-25-7 Not Listed 7440-25-7 7440-25-7 Not Listed 7440-25-7 7440-25-7 Not Listed 7440-26-7 7440-20-0 Not Listed 7440-20-0 7440-21-3 Not Listed 7440-21-3 7440-22-7 Not Listed 7440-22-2 7440-23-7 Not Listed 7440-22-2 7440-22-8 Not Listed 7440-22-8 7440-31 Not Listed 7440-32-6 7440-32-6 Not Listed 7440-31 7440-31 Not Listed 7440-32-6 7440-32-6 Not Listed 7440-44-0 7440-32-6 Not Listed 7440-47-3 Not Listed 7440-47-3 Not Listed 7440-47-3 Not Listed 7440-48-4 Carcrinogen, 7440-48-4 </td <td>7440-03-1 Not Listed Section 313 - PBT Chemical Listing 7440-58-6 Not Listed atable origin) 7440-44-0 Not Listed 7439-96-5 Not Listed 7440-27-3 7440-48-4 Not Listed 7440-28-7 7440-48-4 Not Listed 7440-29-5 7440-48-4 Not Listed 7440-29-7 7440-48-4 Not Listed 7440-20-0 7440-20-0 Not Listed 7440-21-3 7440-21-3 Not Listed 7440-21-3 7440-22-0 Not Listed 7440-22-0 7440-22-2 Not Listed 7440-22-2 7440-22-3 Not Listed 7440-22-8 7440-22-4 Not Listed 7440-22-6 7440-32-6 Not Listed 7440-43-4 7440-43-4 Not Listed 7440-25-7 Not Listed</td>	7440-03-1 Not Listed Section 313 - PBT Chemical Listing 7440-58-6 Not Listed atable origin) 7440-44-0 Not Listed 7439-96-5 Not Listed 7440-27-3 7440-48-4 Not Listed 7440-28-7 7440-48-4 Not Listed 7440-29-5 7440-48-4 Not Listed 7440-29-7 7440-48-4 Not Listed 7440-20-0 7440-20-0 Not Listed 7440-21-3 7440-21-3 Not Listed 7440-21-3 7440-22-0 Not Listed 7440-22-0 7440-22-2 Not Listed 7440-22-2 7440-22-3 Not Listed 7440-22-8 7440-22-4 Not Listed 7440-22-6 7440-32-6 Not Listed 7440-43-4 7440-43-4 Not Listed 7440-25-7 Not Listed

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obalt Based Alloys										
	-i - i;			÷						
• Tantalum							7440-25-7	Not Listed		
Cobalt (powder)							7440-48-4	Not Listed		
 Aluminum powder, stab 	ilizod						7429-90-5	Not Listed		
	IIIZEU									
 Molybdenum (powder) Nickel, massive, ≥ 1 mm 							7439-98-7	Not Listed		
							7440-02-0	Not Listed		
• Silicon			111	111		: * *	7440-21-3	Not Listed	: ' '	111
Tungsten, powder							7440-33-7	Not Listed		
Vanadium							7440-62-2	Not Listed		
• Iron	· · · · · ;		1.1	÷		1.1	7439-89-6	Not Listed		÷
Titanium, massive							7440-32-6	Not Listed		
Niobium							7440-03-1	Not Listed		
J.S California - Propo	sition 65 -	Maximum	Allowable Do	ose Levels	(MADL)					1.1
 Hafnium 							7440-58-6	Not Listed		
· Carbon (animal or veget	table origin))					7440-44-0	Not Listed		
Chromium, massive	, <u> </u>						7440-47-3	Not Listed		
Manganese (powder)							7439-96-5	Not Listed		
Tantalum							7440-25-7	Not Listed		
Cobalt (powder)							7440-48-4	Not Listed		
 Aluminum powder, stab 	ilized			÷			7429-90-5	Not Listed		
Molybdenum (powder)							7439-98-7	Not Listed		
 Nickel, massive, ≥ 1 mm 	1						7440-02-0	Not Listed		
Silicon				1.1			7440-21-3	Not Listed	· ·	1.1
Tungsten, powder							7440-33-7	Not Listed		
Vanadium							7440-62-2	Not Listed		
Iron							7439-89-6	Not Listed		
Titanium, massive			111	11		: • •	7440-32-6	Not Listed	: ' '	
Niobium							7440-03-1	Not Listed		
 J.S California - Proposition Hafnium 	sition 65 -	No Significa	ant Risk Leve	els (NSRL)			7440-58-6	Not Listed		1
							7440-56-6			
Carbon (animal any card							7440-44-0	Not Listed		
Carbon (animal or veget	table origin)	۱ 		· . :						1.1
Chromium, massive	table origin))		1.1		• •	7440-47-3	Not Listed		1.1
Chromium, massiveManganese (powder)	table origin))		1.1	1::	• •	7440-47-3 7439-96-5	Not Listed Not Listed		
Chromium, massiveManganese (powder)Tantalum	table origin))		:.:			7440-47-3 7439-96-5 7440-25-7	Not Listed Not Listed Not Listed		
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder)) : :. 		:+ 			7440-47-3 7439-96-5 7440-25-7 7440-48-4	Not Listed Not Listed Not Listed Not Listed		14
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab 				14 16		· : :	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5	Not Listed Not Listed Not Listed Not Listed Not Listed		14 13
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) 	ilized) : ::		14 151		· : :··	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		ря ht
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm 	ilized	нана 1					7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon 	ilized	нана 1	· · ·	94 195 49		· : • · ·	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	· : •··	14 15 45
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder 	ilized	нана 1	•••	94 191 191		· : •··	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon 	ilized	нана 1				· · : 	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		÷.,
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder 	ilized	нана 1				· : 	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium 	ilized	нана 1					7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed		÷.,
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron 	ilized	нана 1				· · : . :	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6	Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed Not Listed	· · ·	÷.,
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium 	ilized						7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6	Not Listed Not Listed		46. 124
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium 	ilized			Female		· : ··· · : · :	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed		÷.,
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium 	ilized sition 65 -	Reproducti		Female		· · · · · · · · ·	7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed		46. 124
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium J.S California - Propo Hafnium Carbon (animal or veget) 	ilized sition 65 - table origin)	Reproducti	ve Toxicity -				7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1	Not Listed Not Listed		41. 14 151
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium U.S California - Propore Hafnium Carbon (animal or veget Chromium, massive 	ilized sition 65 -	Reproducti		Female			7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-34-0 7440-58-6 7440-58-6 7440-44-0 7440-44-0	Not Listed Not Listed		46. 124
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium J.S California - Propose Hafnium Carbon (animal or veget Chromium, massive Manganese (powder) 	ilized sition 65 - table origin)	Reproducti	ve Toxicity -				7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-32-6 7440-58-6 7440-44-0 7440-47-3 7439-96-5	Not Listed Not Listed		41. 14 151
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium U.S California - Propore Hafnium Carbon (animal or veget Chromium, massive Manganese (powder) Tantalum 	ilized sition 65 - table origin)	Reproducti	ve Toxicity -				7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-03-1 7440-38-6 7440-44-0 7440-47-3 7439-96-5 7440-25-7	Not Listed Not Listed		41 14 15 15 16
 Chromium, massive Manganese (powder) Tantalum Cobalt (powder) Aluminum powder, stab Molybdenum (powder) Nickel, massive, ≥ 1 mm Silicon Tungsten, powder Vanadium Iron Titanium, massive Niobium U.S California - Propore Hafnium Carbon (animal or veget Chromium, massive Manganese (powder) 	iliżed sition 65 - table origin)	Reproducti	ve Toxicity -				7440-47-3 7439-96-5 7440-25-7 7440-48-4 7429-90-5 7439-98-7 7440-02-0 7440-21-3 7440-33-7 7440-33-7 7440-62-2 7439-89-6 7440-32-6 7440-32-6 7440-58-6 7440-44-0 7440-47-3 7439-96-5	Not Listed Not Listed		41. 14 151

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		1.							11.			
obalt Based Alloys												
		÷:									11.	
 Molybdenum (powersteinen) 	der)							7439-98-7	Not Listed			
 Nickel, massive, ≥ 1 	-							7440-02-0	Not Listed		1.1	
 Silicon 								7440-21-3	Not Listed			
• Tungsten, powder								7440-33-7	Not Listed			
Vanadium								7440-62-2	Not Listed			
Iron								7439-89-6	Not Listed			
					111			7439-89-8	Not Listed		111	
Titanium, massive												
Niobium								7440-03-1	Not Listed			
I.S California - Pr	oposition	65 - Rep	oroductive	Foxicity - N	lale	: : :			111		÷	
 Hafnium 								7440-58-6	Not Listed			
Carbon (animal or v	vegetable o	origin)						7440-44-0	Not Listed		1.1	
 Chromium, massive 	e '							7440-47-3	Not Listed			
 Manganese (powd 	er)							7439-96-5	Not Listed			
Tantalum								7440-25-7	Not Listed			
Cobalt (powder)								7440-48-4	Not Listed			
 Aluminum powder, 	stabilized	111			111	· .		7429-90-5	Not Listed			
 Molybdenum (power) 								7439-98-7	Not Listed			
 Nickel, massive, ≥ 1 								7440-02-0	Not Listed			
 Silicon 		÷			÷			7440-21-3	Not Listed		1	
Tungsten, powder								7440-21-3	Not Listed			
								7440-33-7				
Vanadium		1.1	1.1		1.1			·	Not Listed		1.1	
• Iron								7439-89-6	Not Listed			
• Titanium, massive								7440-32-6	Not Listed			
Niobium								7440-03-1	Not Listed			
											· · · · · · · · · · · · · · · · · · ·	
5.2 Chemical	Safety	Asses	ssment			1						
5.2 Chemical	Safety		ssment No Chemi	cal Safety	/ Assessr		been ca					
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tig int	1.1	n [;]	No Chemi	111	11.	nent has		arried out.	ed.	'		
	1.1	n [:] :•	No Chemi WARNING	G: This pro	11.	nent has tains a ch		arried out.	ne State of C	'		
	1.1	n [:] :•	No Chemi	G: This pro	11.	nent has		arried out.	ed.	'		
5.3 Other Info	ormatio	n	No Chemi WARNING cause car	G: This pro	11.	nent has tains a ch		arried out.	ed.	'		
5.3 Other Info Section 16 - O	rmation	n	No Chemi WARNING cause car	G: This pro	oduct con	nent has tains a ch		arried out.	ne State of C	'		
5.3 Other Info Section 16 - O	rmation	n format	No Chemi WARNING cause car	G: This pro	oduct con	nent has tains a ch	nemical	arried out. known to th	ed.	aliforn	ia to	
5.3 Other Info Section 16 - O	ther Inf	n format	No Chemi WARNING cause car tion xt) H228 - Fla H228 - Fla H251 - Se	G: This pro ocer.	solid	nent has tains a ch		arried out. known to tl	ne State of C	aliforn	iia to	
5.3 Other Info Section 16 - O	rmation	n format	No Chemi WARNING cause car tion kt) H228 - Fla H251 - Se H260 - In	G: This producer.	solid	nent has tains a ch		arried out. known to tl	ne State of C	aliforn	ia to	
5.3 Other Info Section 16 - O Relevant Phrases	ther Inf	n format	No Chemi WARNING cause car tion kt) H228 - Fla H251 - Se H260 - In spontaneo	G: This producer.	solid ; may cat ith water	nent has tains a ch		arried out. known to tl	ne State of C	aliforn	iia to	
	ther Inf	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha	G: This pro icer.	solid ; may cat ith water vallowed	nent has tains a ch	flammal	arried out. known to tl	ne State of C	aliforn		
5.3 Other Info Section 16 - O	ther Inf	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su	ammable s If-heating contact w busly rmful if sw	solid ; may cat ith water vallowed of damagi	nent has tains a ch ch fire releases ng fertility	flammal	arried out. known to tl ble gases v unborn chil	vhich may ig	aliforn	iia to	
5.3 Other Info Section 16 - O	ther Inf	n format	No Chemi WARNING cause car tion tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma	ammable s lf-heating contact w busly rmful if sw spected c ay cause l	solid ; may cat ith water vallowed of damagi	nent has tains a ch ch fire releases ng fertility	flammal	arried out. known to tl	vhich may ig	aliforn		
5.3 Other Info Section 16 - O elevant Phrases	ther Inf	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma 08/March/	Ammable s ammable s lf-heating contact w busly rmful if sw spected c ay cause l 2018	solid ; may cat ith water vallowed of damagi	nent has tains a ch ch fire releases ng fertility	flammal	arried out. known to tl ble gases v unborn chil	vhich may ig	aliforn		
5.3 Other Info Section 16 - O Relevant Phrases	ther Inf	n format	No Chemi WARNING cause car tion tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma	Ammable s ammable s lf-heating contact w busly rmful if sw spected c ay cause l 2018	solid ; may cat ith water vallowed of damagi	nent has tains a ch ch fire releases ng fertility	flammal	arried out. known to tl ble gases v unborn chil	vhich may ig	aliforn		
5.3 Other Info Section 16 - O elevant Phrases evision Date reparation Date isclaimer/Staten	ther Inf	format	No Chemi WARNING cause car tion tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma 08/March/ 24/Februa The inform	ammable s lf-heating contact w busly rmful if sw spected c ay cause l 2018 ry/2016	solid ; may cat ith water vallowed of damagi ong lastir	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the t	arried out. known to tl ble gases v unborn chil	vhich may ig	aliforn	iia to	
5.3 Other Info Section 16 - O elevant Phrases evision Date reparation Date isclaimer/Staten	ther Inf	format	No Chemi WARNING cause car tion tion H228 - Fla H251 - Se H260 - In spontaneo H362 - Ha H361 - Su H361 - Su H413 - Ma 08/March/ 24/Februa	ammable s lf-heating contact w busly rmful if sw spected c ay cause l 2018 ry/2016	solid ; may cat ith water vallowed of damagi ong lastir	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the t	arried out. known to tl ble gases v unborn chil	vhich may ign	aliforn	iia to	
5.3 Other Info Section 16 - O elevant Phrases evision Date reparation Date isclaimer/Staten iability	ther Inf	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontanec H302 - Ha H361 - Su H413 - Ma 08/March/ 24/Februa The inform made.	G: This pro- icer.	solid ; may cat ith water vallowed of damagi ong lastir ein is give	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the i l effects	arried out. known to the ble gases v unborn chile to aquatic ut no warra	vhich may ign d. life	aliforn hite	mplied, is	5
5.3 Other Info Section 16 - O	ther Inf	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontanec H302 - Ha H361 - Su H413 - Ma 08/March/ 24/Februa The inform made.	G: This pro- icer.	solid ; may cat ith water vallowed of damagi ong lastir ein is give	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the i l effects	arried out. known to the ble gases v unborn chile to aquatic ut no warra	vhich may ign d. life	aliforn hite	mplied, is	5
5.3 Other Info Section 16 - O Relevant Phrases Revision Date reparation Date risclaimer/Staten iability ey to abbreviations DA = No Data Availabl	ther Inf (code &	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma 08/March/ 24/Februa The inform made.	Ammable s ammable s If-heating contact w ously rmful if sw spected c ay cause I 2018 ry/2016 hation her	solid ; may cat ith water vallowed of damagi ong lastir ein is give	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the t or the t or the t d faith b	arried out. known to tl ble gases v unborn chil to aquatic ut no warra	vhich may ign d. life	aliforn nite	mplied, is	5
5.3 Other Info Section 16 - O Relevant Phrases Revision Date reparation Date risclaimer/Staten iability ey to abbreviations DA = No Data Availabl	ther Inf (code &	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma 08/March/ 24/Februa The inform made.	Ammable s ammable s If-heating contact w ously rmful if sw spected c ay cause I 2018 ry/2016 hation her	solid ; may cat ith water vallowed of damagi ong lastir ein is give	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the t or the t or the t d faith b	arried out. known to tl ble gases v unborn chil to aquatic ut no warra	vhich may ign d. life	aliforn nite	mplied, is	5
5.3 Other Info Section 16 - O elevant Phrases evision Date reparation Date isclaimer/Staten iability ay to abbreviations DA = No Data Availabl	ther Inf (code &	n format	No Chemi WARNING cause car tion H228 - Fla H251 - Se H260 - In spontaneo H302 - Ha H361 - Su H413 - Ma 08/March/ 24/Februa The inform made.	Ammable s ammable s If-heating contact w ously rmful if sw spected c ay cause I 2018 ry/2016 hation her	solid ; may cat ith water vallowed of damagi ong lastir ein is give	nent has tains a ch ch fire releases ng fertility ng harmfu	flammal or the t or the t or the t d faith b	arried out. known to tl ble gases v unborn chil to aquatic ut no warra	vhich may ign d. life	aliforn nite	mplied, is	5
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