| obalt Based | Alloys | | | | | | | | | | | |
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| afety | Data Sh | neet | | | | | DVAN | ICED | VIATE | RIALS | 6 | |
| 111 | | : | 111 | | | 11 | · : . | ; • • | 111 | · . | | |
| Sectio | n 1: Ide | ntificat | ion of | f the Subs | tance/M | lixture | and o | f the Co | mpan | y/Undei | taking | ÷ |
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| .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) | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| | | | | s of the su | | | | | | Ŭ | | |
| 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 | | | | | |
| | | | • | 101.194914 | | | | | | | | |
| · | | :** | | Address : 2 | | her Dr., | Lake Fo | orest, CA 9 | 2630 U | .S.A. | : | 111 |
| · · · | Felephon | e (Gene | • | | 3661 Birtc | her Dr., | Lake Fo | orest, CA S | 92630 U | .S.A. | : | 11 |
| 111 111 | Felephon | e (Gene | • | Address : 23 | 3661 Birtc | | | | 02630 U | | : : | · · |
| ÷ | ::: | | ral) • | Address : 23 | 3661 Birtc)4 | | | | | | :** }-1 | · |
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| 1.4 Em Manufac Sectio EU/EEC ccordin | ergency turer n 2: Haz g to: Reg | / teleph zards lo | ral) • none i dentif (EC) No he su | Address : 23 (949) 407-890 number (949) 407-89 ication 1272/2008 (bstance o | 3661 Birtc)4)04 (CLP)/REA | ACH 190 | | :: :: :: | I by 201 | | | :.: |
| .4 Em Aanufac Sectio CCOrdin | ergency turer n 2: Haz g to: Reg | / teleph zards lo | ral) • none i dentif (EC) No he su | Address : 23 (949) 407-890 number (949) 407-89 (949) 407-89 ication 1272/2008 (bstance o Skin Sensiti Respiratory | 3661 Birtc)4)04)04 (CLP)/REA r mixtur zation 1 - Sensitizat | ACH 190 Te H317 tion 1 - H | | i i i i i i i i amendeo | I by 201 | 15/830] | | :.: |
| .4 Em Aanufac Sectio U/EEC ccordin 2.1 Clas | ergency turer n 2: Haz g to: Reg | / teleph zards lo ulation (| ral) • none i dentif (EC) No he su | Address : 23 (949) 407-890 number (949) 407-89 (949) 407-89 ication 1272/2008 (bstance o Skin Sensiti Respiratory Carcinogeni | 3661 Birtc)4)04)04 (CLP)/REA (CLP)/REA r mixtur zation 1 - Sensitizat city 2 - H3 | ACH 190 'e H317 tion 1 - H 351 | 1334 | : : [amendeo | I by 201 | 5/830] | | :.: |
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| .4 Em Aanufac Sectio CCOrdin 2.1 Clas CLP 2.2 Lab | ergency turer n 2: Haz g to: Reg ssificati | zards lo | ral) • none i dentif (EC) No he su | Address : 23 (949) 407-890 number (949) 407-89 ication ication 1272/2008 (bstance o Skin Sensiti Respiratory Carcinogeni Reproductiv Specific Tar Specific Tar | 3661 Birtc)4)04)04 (CLP)/REA r mixtur zation 1 - Sensitizat city 2 - H3 e Toxicity get Organ get Organ get Organ | ACH 190 Te H317 tion 1 - H 351 2 - H361 Toxicity | 1334 Repeat Repeat | amendeo i | I by 201 ure 1 - H ure 2 - H | 5/830] 1372 1373 | | |
| I.4 Em Manufac Sectio CLP 2.1 Clas CLP 2.2 Lab | ergency turer n 2: Haz g to: Reg ssificati | zards lo | ral) • none i dentif (EC) No he su | Address : 23 (949) 407-890 number (949) 407-89 ication ication 1272/2008 (bstance o Skin Sensiti Respiratory Carcinogeni Reproductiv Specific Tar Specific Tar | 3661 Birtc)4)04)04 (CLP)/REA r mixtur zation 1 - Sensitizat city 2 - H3 e Toxicity get Organ get Organ get Organ | ACH 190 re H317 tion 1 - H 351 2 - H361 Toxicity Toxicity | 7/2006 I334 fd Repeat Repeat | amendeo i | I by 201 ure 1 - H ure 2 - H | 5/830] 1372 1373 | | |
| .4 Em Aanufac Sectio CCOrdin 2.1 Clas CLP 2.2 Lab | ergency turer n 2: Haz g to: Reg ssificati | v teleph zards lo ulation (ion of t | ral) • none i dentif (EC) No he su • | Address : 23 (949) 407-890 number (949) 407-89 ication ication 1272/2008 (bstance o Skin Sensiti Respiratory Carcinogeni Reproductiv Specific Tar Specific Tar | 3661 Birtc 04 004 004 CLP)/REA r mixtur zation 1 - Sensitizat city 2 - H3 e Toxicity get Organ get Organ | ACH 190 Fe H317 tion 1 - H 351 2 - H361 Toxicity Toxicity | 7/2006 I334 fd Repeat Repeat | amendeo i | I by 201 ure 1 - H ure 2 - H | 5/830] 1372 1373 | | |



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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 | • |
| ÷. | | <u>.</u> | ÷ | | | :•1 | <u> </u> | ÷., | ::: | | ÷ | |
| 1 | | | | | | | | | | • • | 1.1 | |
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; ' ' Page 2' of 23

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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 | | | | | | | |
| | | | | | | | | :** | 11 | ·: | ;•• | ·:: | |
| 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 | :.: · : | | |
| 2 La | A HCS 201 abel elem | 2 ents | 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 | :.: · : | | |
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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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| 2 La | A HCS 201 Abel elem A HCS 201 | 2 ents 2 | ан 14 14 | Skin Sensiti Eye Irritation Respiratory Carcinogeni Reproductiv Specific Tar Combustible Hazards No | zation 1 2 Sensitiza city 2 e Toxicity get Organ e Dust t Otherwi | ation 1 / 2 n Toxici se Class | ty Repea sified - He | ted Expos ealth Haza | ure 1 rds - Me | etal fume f | ever | 94 53 | |

| 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. | |
| OSHA anada | her haza A HCS 201 | rds 2 | ···· ····• | Dispose of internationa 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 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 | |
| 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 | |
| OSHA anada cordir | her haza A HCS 201 a ng to: WH | rds 2 MIS 2015 | | Dispose of internationa Heating ab fever by inf Under Unite Standard), | ed up, content al regulat ove the r halation. 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 | |
| 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 | |
| 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 | |
| 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 | |
| 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 Sensir Eye Irritation Respiratory Carcinoger Reproductiv Specific Ta Health Haz | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not | and/or co tions. melting p The sym s Regula duct is co uct is co uct is co totherwi | 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 c Skin Sensi Eye Irritation Respiratory Carcinoger Reproduction | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not | and/or co tions. melting p The sym s Regula duct is co uct is co uct is co totherwi | 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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| OSHA anada cordir 1 Cla WHM | her haza A HCS 201 a ng to: WH assificati IIS 2015 bel elem | rds 2 MIS 2015 | ne su | Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensir Eye Irritation Respiratory Carcinoger Reproductiv Specific Ta Health Haz | ove the malation. ed States this proceed this proceed thi | and/or co tions. melting p The sym s Regula duct is co uct is co uct is co duct is co totherwi 1 | ontainer in point relea ptoms are tions (29 onsidered ise Classi | n accorda ses metal e shivering CFR 1910 hazardou ted Expos fied 1 | 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 1 Cla WHM | her haza A HCS 201 a ng to: WH Assificati | rds 2 MIS 2015 | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproductiv Specific Ta Health Haz Combustibl | ove the malation. ed States this proceed this proceed thi | and/or co tions. melting p The sym s Regula duct is co uct is co uct is co duct is co totherwi 1 | ontainer in point relea ptoms are tions (29 onsidered ise Classi | n accorda ses metal e shivering CFR 1910 hazardou ted Expos fied 1 | 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 1 Cla WHM 2 Lat WHM | her haza A HCS 201 a ng to: WH ASSIFICATI IIS 2015 bel elem IIS 2015 | rds 2 MIS 2015 ion of th | ne su | Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproduction Specific Ta Health Haz Combustible | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not le Dusts | and/or co tions. The sym s Regula duct is co ure 1 zation 1 ity 2 an Toxic t Otherwi 1 | ontainer in point relea ptoms are tions (29 onsidered | n accorda e shivering CFR 1910 hazardou | llic oxide g, fever, f).1200 - s. | s which m malaise ar Hazard Co | nay cause nd muscul ommunica | metal fu ar pain. tion | |
| OSHA anada cordir 1 Cla WHM | her haza A HCS 201 a ng to: WH assificati IIS 2015 bel elem | 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 Specific Ta Health Haz Combustibl | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not le Dusts | and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1 ity 2 an Toxic t Otherwi 1 | ontainer in point relea ptoms are tions (29 onsidered | n accorda e shivering CFR 1910 hazardou | llic oxide g, fever, f).1200 - s. | s which m malaise ar Hazard Co | nay cause nd muscul ommunica | metal fu ar pain. tion | |
| OSHA anada cordir .1 Cla WHM | her haza A HCS 201 a ng to: WH ASSIFICATI IIS 2015 bel elem IIS 2015 | rds 2 MIS 2015 ion of th | ne su | Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproduction Specific Ta Health Haz Combustible | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not le Dusts | and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1 ity 2 an Toxic t Otherwi 1 | ontainer in point relea ptoms are tions (29 onsidered | n accorda e shivering CFR 1910 hazardou | llic oxide g, fever, f).1200 - s. | s which m malaise ar Hazard Co | nay cause nd muscul ommunica | metal fu ar pain. tion | |
| OSHA anada cordir .1 Cla WHM | her haza A HCS 201 a ng to: WH ASSIFICATI IIS 2015 bel elem IIS 2015 | rds 2 MIS 2015 ion of th | ne su | Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproduction Specific Ta Health Haz Combustible | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not le Dusts | and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1 ity 2 an Toxic t Otherwi 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 au Hazard Co | nay cause nd muscul ommunica | metal fu ar pain. tion | Ime |
| OSHA anada cordir .1 Cla WHM | her haza A HCS 201 a ng to: WH ASSIFICATI IIS 2015 bel elem IIS 2015 | rds 2 MIS 2015 ion of th | ne su | Dispose of international Heating ab fever by inf Under Unite Standard), bstance o Skin Sensi Eye Irritation Respiratory Carcinoger Reproduction Specific Ta Health Haz Combustible | ed up, content al regulat ove the r nalation. ed States this proc or mixt tization 1 on 2 / Sensitiz nicity 2 ve Toxici rget Org ards Not le Dusts | and/or co tions. melting p The sym s Regula duct is co ure 1 zation 1 ity 2 an Toxic t Otherwi 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 au Hazard Co | nay cause nd muscul ommunica | metal fu ar pain. tion | Ime |

| | | | | | | ÷ | | | · · . | | | ÷ | : |
|--------|----------|-----------|---------|----------------------------|---|-------------------------------------|---------------------------------------|-------------------------------------|------------------------|--------------|---------------------------------|-------------|------|
| | | · : | | 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 | |
|--------|-------|--------|--|
|--------|-------|--------|--|

| | | : : : | | | 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

| | . | | | | | |
|-----|---------------|--------------|------------|-------------------|------|--|
| · • | 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 | | | |

Page 13 of 23

· · · · ·

÷:.

| 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.

•

- 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 |
|--|---------|--------|--------|---------|---------|------|
|--|---------|--------|--------|---------|---------|------|

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 | | |
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| 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 | | |
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| 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 | |
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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 |
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| bilized | | | | | | | 7429-90-5 | Not Listed | | |
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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 | | |
| :·· · | | | : • • | 1.1 | . : | : • • | 7440-25-7 | Not Listed | | · . · |
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| | | | 1.1 | 14. C | | 1.1 | | | | |
| | | | | | | | 7439-98-7 | | | |
| n | | | | | | | 7440-02-0 | • | 10/1/1989 | 1 |
| · · · · · | | 1. | | 1.1 | 1.1 | | 7440-04-0 | | | |
| | | | | | | | 7440-21-3 | Not Listed | | |
| | | | | | | | 7440-33-7 | Not Listed | | |
| | | | | | | | 7440-62-2 | Not Listed | | |
| | | | | | | | 7439-89-6 | Not Listed | | |
| | | .: | | 1.1 | | | | | | |
| ;; | | | ;** | 111 | | | 7440-32-6 | Not Listed | | |
| | | · <u> </u> | ;··· | 11 | | | | | | |
| 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 | | | | | | | | | | |
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| • 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 |

3 .:

| | | 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 | | | | | |
| | 1.1 | • | | cal Safety | / Assessr | | been ca | | | | 111 111 | |
| 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 |
| 5.3 Other Info Section 16 - O elevant Phrases evision Date reparation Date isclaimer/Staten iability by 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 If-heating contact wously rmful if sw spected c 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 |