

ITEM: 4LE92 - END MILL COBALT 1/2 IN

PICK REQ: 1134102526

MATERIAL SAFETY DATA SHEET (MSDS)

MSDS: A6334

This MSDS should be attached or kept with the respective product with which it is associated.

MATERIAL SAFETY DATA SHEET - A6334

Associated Grainger Item: 4LE92 - END MILL COBALT 1/2 IN

4CB785	4GB775	4GB776	4GB777	4GB778	4GB779	4GB780	4GB781	4GB782	4GB783	4GB784
4CB856	4GB866	4GB867	4GB868	4GB869	4GB870	4GB871	4GB872	4GB873	4GB874	4GB875
4CB896	4GB897	4GB898	4GB899	4GB900	4GB901	4GB902	4GB903	4GB904	4GB905	4GB906
1C2402	1C2444	1C2466	1C2488	1C2500	1C2566	1C2588	1C2600	1C2622	1C2644	1C2666
1C2688	1C2700	1C2722	1C2744	1C2766	1C2788	1C2800	1C2822	1C2844	1C2866	1C2888
1C2936	1C2958	1C2970	1C2992	1C3004	1C3036	1C3058	1C3070	1C3092	1C3114	1C3136
1C3158	1C3170	1C3192	1C3214	1C3236	1C3258	1C3270	1C3292	1C3314	1C3336	1C3358
1C3370	1C3392	1C3414	1C3436	1C3458	1C3480	1C3502	1C3524	1C3546	1C3568	1C3590
1C3612	1C3636	1C3658	1C3670	1C3692	1C3714	1C3736	1C3758	1C3770	1C3792	1C3814
1C3868	1C3888	1C3888	1C3900	1C3922	1C3944	1C3966	1C3988	1C4000	1C4022	1C4044
1C4060	1C4080	1C4100	1C4122	1C4144	1C4166	1C4188	1C4200	1C4222	1C4244	1C4266
1C4288	1C4300	1C4322	1C4344	1C4366	1C4388	1C4400	1C4422	1C4444	1C4466	1C4488
1C4500	1C4522	1C4544	1C4566	1C4588	1C4610	1C4632	1C4654	1C4676	1C4698	1C4720
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1C5170	1C5190	1C5210	1C5230	1C5250	1C5270	1C5290	1C5310	1C5330	1C5350	1C5370
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1U025,	1U027,	1U029,	1U031,	1U033,	1U035,	1U042,	1U044,	1U046,	1U048,	1U080,	1Z108,	1Z110,	1Z112,	1Z114,	1Z116,	1Z118,	1Z120,	1Z122,	1Z124,	1Z126,	1Z12
1U088,	1U098,	1U100,	1U102,	1U104,	1U110,	1U129,	1U131,	1U133,	1U135,	1U137,	1Z130,	1Z132,	1Z134,	1Z136,	1Z138,	1Z140,	1Z142,	1Z144,	1Z146,	1Z148,	1Z15
1U139,	1U144,	1U150,	1U152,	1U186,	1U188,	1U190,	1U192,	1U194,	1U196,	1U198,	1Z152,	1Z154,	1Z156,	1Z158,	1Z160,	1Z162,	1Z164,	1Z166,	1Z168,	1Z170,	1Z17
1U200,	1U202,	1U212,	1U214,	1U216,	1U218,	1U220,	1U222,	1U224,	1U226,	1U228,	1Z174,	1Z176,	1Z178,	1Z180,	1Z182,	1Z184,	1Z186,	1Z188,	1Z190,	2F245,	2F27
1U230,	1U234,	1U296,	1U298,	1U300,	1U302,	1U304,	1U306,	1U308,	1U310,	1U312,	2F276,	2F277,	2F278,	2F279,	2F280,	2F281,	2F282,	2F283,	2F284,	2F285,	2F28
1U314,	1U316,	1U318,	1U320,	1U322,	1U324,	1U326,	1U328,	1U330,	1U332,	1U334,	2F287,	2F288,	2F289,	2F290,	2F291,	2F292,	2F293,	2F294,	2F295,	2F296,	2F29
1U336,	1U338,	1U340,	1U342,	1U344,	1U346,	1U348,	1U350,	1U352,	1U354,	1U367,	2F298,	2F299,	2F301,	2F302,	2F303,	2F304,	2F305,	2F306,	2F307,	2F308,	2F30
1U369,	1U371,	1U373,	1U375,	1U377,	1U379,	1U381,	1U383,	1U385,	1U387,	1U389,	2G010,	2G011,	2G012,	2G013,	2G014,	2G015,	2G016,	2G017,	2G018,	2G019,	2G02
1U968,	1U970,	1U972,	1U974,	1U976,	1U978,	1U980,	1U982,	1U984,	1U986,	1U988,	2G021,	2G022,	2G023,	2G024,	2G025,	2G026,	2G027,	2G028,	2G029,	2G030,	2G03
1U990,	1U992,	1U994,	1U996,	1U998,	1V002,	1V004,	1V006,	1V008,	1V010,	1V012,	2G032,	2G033,	2G034,	2G035,	2G036,	2G037,	2G038,	2G039,	2G040,	2G041,	2G04
1V014,	1V016,	1V018,	1V020,	1V022,	1V024,	1V026,	1V028,	1V030,	1V032,	1V034,	2G043,	2G044,	2G045,	2G046,	2G047,	2G048,	2G049,	2G050,	2G051,	2G052,	2G05
1V036,	1V038,	1V040,	1V042,	1V044,	1V046,	1V048,	1V051,	1V053,	1V055,	1V057,	2G054,	2G055,	2G056,	2G057,	2G058,	2G059,	2G060,	2G061,	2G062,	2G063,	2G06
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1V081,	1V083,	1V085,	1V087,	1V089,	1V091,	1V093,	1V095,	1V097,	1V099,	1V101,	2G076,	2G077,	2G078,	2G079,	2G080,	2G081,	2G082,	2G083,	2G084,	2G085,	2G08
1V103,	1V105,	1V107,	1V109,	1V111,	1V113,	1V115,	1V117,	1V119,	1V121,	1V123,	2G087,	2G088,	2G089,	2G090,	2G091,	2G092,	2G093,	2G094,	2G095,	2G096,	2G09
1V125,	1V127,	1V129,	1V131,	1V133,	1V135,	1V137,	1V139,	1V141,	1V143,	1V145,	2G098,	2G099,	2G101,	2G102,	2G103,	2G104,	2G105,	2G106,	2G107,	2G108,	2G10
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1V171,	1V173,	1V175,	1V177,	1V179,	1V181,	1V183,	1V185,	1V187,	1V189,	1V191,	2G121,	2G122,	2G123,	2G124,	2G125,	2G126,	2G127,	2G128,	2G129,	2G130,	2G13
1V196,	1V198,	1V200,	1V202,	1V205,	1V207,	1V209,	1V211,	1V213,	1V215,	1V217,	2G132,	2G133,	2G134,	2G135,	2G136,	2G137,	2G138,	2G139,	2G140,	2G141,	2G14
1V219,	1V221,	1V223,	1V225,	1V227,	1V229,	1V231,	1V233,	1V235,	1V237,	1V239,	2G143,	2G144,	2G145,	2G146,	2G147,	2G148,	2G149,	2G150,	2G151,	2G152,	2G15
1V241,	1V243,	1V245,	1V247,	1V249,	1V251,	1V253,	1V255,	1V257,	1V260,	1V262,	2G154,	2G155,	2G156,	2G157,	2G158,	2G159,	2G160,	2G161,	2G162,	2G163,	2G16
1V264,	1V266,	1V268,	1V270,	1V272,	1V274,	1V276,	1V278,	1V280,	1V282,	1V284,	2G165,	2G166,	2G167,	2G168,	2G169,	2G170,	2G171,	2G172,	2G173,	2G174,	2G17
1V286,	1V288,	1V293,	1V295,	1V297,	1V299,	1V301,	1V303,	1V305,	1V307,	1V309,	2G176,	2G177,	2G178,	2G179,	2G180,	2G181,	2G182,	2G183,	2G184,	2G185,	2G18
1V311,	1V313,	1V315,	1V317,	1V319,	1V321,	1V323,	1V325,	1V327,	1V329,	1V331,	2G187,	2G188,	2G189,	2G190,	2G191,	2G192,	2G193,	2G194,	2G195,	2G196,	2G19
1V333,	1V335,	1V337,	1V339,	1V341,	1V343,	1V345,	1V347,	1V351,	1V353,	1V355,	2G198,	2G199,	2G201,	2G202,	2G203,	2G204,	2G205,	2G206,	2G207,	2G208,	2G20
1V357,	1V359,	1V361,	1V363,	1V365,	1V367,	1V369,	1V371,	1V373,	1V375,	1V378,	2G210,	2G211,	2G212,	2G213,	2G214,	2G215,	2G216,	2G217,	2G218,	2G219,	2G22
1V380,	1V382,	1V384,	1V386,	1V388,	1V390,	1V392,	1V394,	1V396,	1V398,	1V400,	2G221,	2G222,	2G223,	2G224,	2G225,	2G226,	2G227,	2G228,	2G229,	2G230,	2G23
1V402,	1V405,	1V407,	1V409,	1V411,	1V413,	1V415,	1V417,	1V419,	1V421,	1V423,	2G232,	2G233,	2G234,	2G235,	2G236,	2G237,	2G238,	2G239,	2G240,	2G241,	2G24
1V425,	1V427,	1V429,	1V431,	1V433,	1V435,	1V437,	1V439,	1V441,	1V443,	1V445,	2G243,	2G244,	2G245,	2G246,	2G247,	2G248,	2G249,	2G250,	2G251,	2G252,	2G25
1V447,	1V449,	1V451,	1V453,	1V455,	1V457,	1V459,	1V461,	1V463,	1V465,	1V467,	2G254,	2G255,	2G256,	2G257,	2G258,	2G259,	2G260,	2G261,	2G262,	2G263,	2G26
1V469,	1V471,	1V473,	1V475,	1V477,	1V479,	1V481,	1V483,	1V485,	1V487,	1V489,	2G265,	2G266,	2G267,	2G268,	2G269,	2G270,	2G271,	2G272,	2G273,	2G274,	2G27
1V491,	1V493,	1V495,	1V497,	1V499,	1V501,	1V503,	1V505,	1V507,	1V509,	1V511,	2G276,	2G277,	2G278,	2G279,	2G280,	2G281,	2G282,	2G283,	2G284,	2G285,	2G28
1V513,	1V515,	1V517,	1V519,	1V521,	1V523,	1V525,	1V527,	1V529,	1V531,	1V533,	2G287,	2G288,	2G289,	2G290,	2G291,	2G292,	2G293,	2G294,	2G295,	2G296,	2G29
1V535,	1V537,	1V539,	1V541,	1V543,	1V545,	1V547,	1V549,	1V551,	1V553,	1V555,	2G296,	2G297,	2G298,	2G299,	2G300,	2G301,	2G302,	2G303,	2G304,	2G305,	2G30
1V557,	1V559,	1V561,	1V563,	1V565,	1V567,	1V569,	1V571,	1V573,	1V575,	1V577,	2G308,	2G309,	2G310,	2G311,	2G312,	2G313,	2G314,	2G315,	2G316,	2G317,	2G31
1V579,	1V581,	1V583,	1V585,	1V587,	1V589,	1V591,	1V593,	1V595,	1V597,	1V599,	2G321,	2G322,	2G323,	2G324,	2G325,	2G326,	2G327,	2G328,	2G329,	2G330,	2G33
1V601,	1V603,	1V605,	1V607,	1V609,	1V611,	1V613,	1V615,	1V617,	1V619,	1V621,	2G332,	2G333,	2G334,	2G335,	2G336,	2G337,	2G338,	2G339,	2G340,	2G341,	2G34
1V623,	1V625,	1V627,	1V629,	1V631,	1V633,	1V635,	1V637,	1V639,	1V641,	1V643,	2G343,	2G344,	2G345,	2G346,	2G347,	2G348,	2G349,	2G350,	2G351,	2G352,	2G35
1V645,	1V647,	1V649,	1V651,	1V653,	1V655,	1V657,	1V659,	1V661,	1V663,	1V665,	2G354,	2G355,	2G356,	2G357,	2G358,	2G359,	2G360,	2G361,	2G362,	2G363,	2G36
1V667,	1V669,	1V671,	1V673,	1V675,	1V677,	1V679,	1V681,	1V683,	1V685,	1V687,	2G365,	2G366,	2G367,	2G368,	2G369,	2G370,	2G371,	2G372,	2G373,	2G374,	2G37
1V689,	1V691,	1V693,	1V695,	1V697,	1V699,	1V701,	1V703,	1V705,	1V707,	1V709,	2G376,	2G377,	2G378,	2G379,	2G380,	2G381,	2G382,	2G383,	2G384,	2G385,	2G38
1V713,	1V715,	1V717,	1V																		

IRON (Fe)	7439-89-6	50-90	10	NONE ESTABLISHED
**TUNGSTEN (W)	7440-33-7	1-20	15	5
MOLYBDENUM (Mo)	7439-98-7	0.5-10	15	10
*CHROMIUM (Cr)	7440-47-3	1-5	1	0.5
VANADIUM (V)	7440-62-2	1-5	5	5
*COBALT (Co)	7440-48-4	5-10	0.1	0.02

MATERIAL NFPA HAZARD RATING SCALE 0-4
HEALTH FIRE REACTIVITY

IRON (Fe)	0	3	0
**TUNGSTEN (W)	1	3	0
MOLYBDENUM (Mo)	1	1	0
*CHROMIUM (Cr)	2	1	1
VANADIUM (V)	2	0	0
*COBALT (Co)	2	3	0

* IDENTIFIES SUBSTANCES THAT ARE SUBJECT TO THE REQUIREMENTS OF SECTION 313 OF TITLE III OF SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

** THIS SUBSTANCE IS REGULATED BY OSHA AS A PARTICULATE NOT OTHERWISE REGULATED (PNOR). THE EXPOSURE LIMIT LISTED FOR OSHA REFERS TO TOTAL DUST; THE OSHA PEL FOR THE RESPIRABLE FRACTION IS 5 MG/M3.

SECTION 3 - HAZARDS IDENTIFICATION

OPERATIONS SUCH AS WELDING, GRINDING, POLISHING, MELTING, AND BRAZING MAY CAUSE DUST OR FUME GENERATION WHICH CAN RESULT IN EXPOSURE TO THE ELEMENTS PRESENT IN THE ALLOY.

(NOTE: HEALTH EFFECTS LISTED ARE FOR EXPOSURE TO METALLURGICAL POWDERS, DUST, OR MIST FROM ALTERING THE TOOL. NO HEALTH EFFECTS HAVE BEEN REPORTED FOR EXPOSURE TO THIS MATERIAL IN SOLID FORM.)

INHALATION:
IRRITANT/SENSITIZER:
250 MG(Cr)/M3, 35 MG(V)/M3 OR 10 MG(Co)/M3 IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.

ACUTE OVEREXPOSURE:
SYMPTOMS OF METAL FUME FEVER INCLUDING CHILLS, FEVER, SWEATING, NAUSEA, AND COUGH MAY APPEAR. METAL FUME FEVER BEGINS 4 TO 12 HOURS AFTER EXPOSURE AND LASTS 24 HOURS WITHOUT CAUSING PERMANENT DAMAGE. OTHER EFFECTS CAUSED BY DUST AND FUME INHALATION INCLUDE METALLIC TASTE, EYES, NOSE, AND THROAT IRRITATION, WHEEZING, DIFFICULTY BREATHING, AND CHEST PAIN.

CHRONIC OVEREXPOSURE:
MAY CAUSE RESPIRATORY IRRITATION, BRONCHITIS, ALLERGIC RESPIRATORY REACTION, OBSTRUCTED AIRWAYS, BUILD-UP OF DUST IN THE LUNGS, DAMAGE TO LUNG TISSUE, AND LUNG DISEASE, WITH SYMPTOMS AS DESCRIBED IN ACUTE OVEREXPOSURE, ESPECIALLY INFLAMMATION OF THE RESPIRATORY TRACT, NOSE AND THROAT IRRITATION, VIOLENT COUGHING, WHEEZING, RASPING, AND SHORTNESS OF BREATH. THERE MAY ALSO BE BLOOD CHANGES, LIVER AND KIDNEY DAMAGE, AND AN INCREASED SUSCEPTIBILITY TO RESPIRATORY CHANGES.

SKIN CONTACT: IRRITANT.

ACUTE OVEREXPOSURE: MAY CAUSE IRRITATION.

CHRONIC OVEREXPOSURE:
MAY CAUSE INFLAMMATION AND/OR RASH (IRRITANT OR ALLERGIC CONTACT DERMATITIS).

EYE CONTACT: IRRITANT.
ACUTE OVEREXPOSURE: MAY CAUSE IRRITATION WITH REDNESS, PAIN, AND ITCHING.
CHRONIC OVEREXPOSURE: MAY CAUSE CONJUNCTIVITIS.

INGESTION: IRRITANT.

ACUTE OVEREXPOSURE:
INGESTION OF LARGE AMOUNTS OF STEEL DUST IS HIGHLY UNLIKELY. HOWEVER, INGESTION OF SMALL AMOUNTS MAY OCCUR BY EATING OR SMOKING WITH CONTAMINATED HANDS.

CHRONIC OVEREXPOSURE:
MAY PRODUCE THE SAME SYMPTOMS AS FOR ACUTE OVEREXPOSURE. MAY ALSO ADVERSELY AFFECT THE PANCREAS, THYROID GLAND, HEART, OR BONE MARROW.

SECTION 4 - FIRST AID MEASURES

INHALATION:
IF SYMPTOMS OF PULMONARY INVOLVEMENT DEVELOP (COUGHING, WHEEZING, SHORTNESS OF BREATH), REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
IF IRRITATION OR RASH OCCURS, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF MATERIAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

EYE CONTACT:
IF IRRITATION OCCURS, WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF MATERIAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
IF THIS MATERIAL HAS BEEN SWALLOWED AND PERSON IS CONSCIOUS, IMMEDIATELY GIVE PERSON LARGE AMOUNTS OF WATER. DO NOT ATTEMPT TO MAKE AN UNCONSCIOUS PERSON DRINK OR VOMIT. GET MEDICAL ATTENTION IMMEDIATELY. INDUCE VOMITING ONLY IF SPECIFICALLY INSTRUCTED BY A PHYSICIAN.

SECTION 5 - FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS:
FINE METAL PARTICLES PRODUCED WHEN GROUND, SAWED, ETC. CAN BURN. HIGH CONCENTRATIONS OF THESE PARTICLES IN THE AIR MAY PRESENT AN EXPLOSION HAZARD.

FLASH POINT: NONE REPORTED.

EXTINGUISHING MEDIA:
IN SOLID FINISHED FORM, WILL NOT BURN. USE WATER TO COOL.

SPECIAL FIREFIGHTING PROCEDURES:
DO NOT RELEASE RUNOFF FROM FIRE CONTROL METHODS TO SEWERS OR WATERWAYS. BECAUSE FIRE MAY PRODUCE TOXIC THERMAL DECOMPOSITION PRODUCTS, WEAR A SELF-CONTAINED BREATHING APPARATUS (SCBA) WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
SWEEP UP WITH MINIMUM AMOUNT OF DUST GENERATION AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR LATER DISPOSAL OR RECLAMATION. RESIDUE SHOULD BE CLEANED UP USING A HIGH EFFICIENCY PARTICULATE FILTER VACUUM OR WET CLEAN UP.

SECTION 7 - HANDLING AND STORAGE

HANDLING PRECAUTIONS:
OPERATIONS SUCH AS WELDING, DUST GENERATION, OR FUME GENERATION CAN RESULT IN HAZARDOUS EXPOSURE TO THE ELEMENTS PRESENT IN THE ALLOY IF NECESSARY PRECAUTIONS AREN'T TAKEN. PROTECT AGAINST DUST AND FUME INHALATION AND SKIN OR EYE CONTACT. USE ONLY WITH LOCAL EXHAUST VENTILATION. IF THE STEEL IS CONTAMINATED WITH OIL OR OTHER COMPOUNDS, TAKE PRECAUTIONS TO PREVENT ADDITIONAL EXPOSURE TO THE CONTAMINANTS WHEN HANDLING, WELDING, CUTTING, AND/OR HEATING OR MELTING.

STORAGE REQUIREMENTS:
STORE IN A MANNER THAT PREVENTS ACCIDENTAL ENVIRONMENTAL CONTAMINATION FROM TRACES OF INDUSTRIAL LUBRICANTS OR WETTING OILS.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR GENERAL DILUTION TO MAINTAIN EXPOSURE LEVELS BELOW THE PEL AND TLV.

RESPIRATORY PROTECTION:

0.05 MG (Co)/M3 - SINGLE-USE APPROVED DUST AND MIST RESPIRATOR.

0.5 MG (Co)/M3 - DUST MASK, EXCEPT SINGLE-USE RESPIRATOR.

1 MG (Co)/M3 - DUST MASK, EXCEPT SINGLE-USE AND QUARTER-MASK RESPIRATOR. FUME OR HIGH EFFICIENCY PARTICULATE RESPIRATOR.

5 MG (Co)/M3 - HIGH EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACEPIECE. SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET OR HOOD. SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

20 MG (Co)/M3 - POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH EFFICIENCY FILTER WITH A FULL FACEPIECE. TYPE "C" SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

FIREFIGHTING:
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. SOILED CLOTHING SHOULD BE LAUNDERED SEPARATELY.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES OR BARRIER CREAMS TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
SAFETY GLASSES WITH SIDE SHIELDS OR GOGGLES ARE RECOMMENDED. WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE. CONTACT LENSES SHOULD NOT BE WORN WHEN HANDLING THESE MATERIALS.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: SOLID, ODORLESS MATERIALS

BOILING POINT: 5000 DEG. F

SOLUBILITY IN WATER: PRACTICALLY INSOLUBLE

MELTING POINT: 2500 DEG. F

PETROLEUM BASED SOLVENT SOLUBILITY: PRACTICALLY INSOLUBLE

SPECIFIC GRAVITY: (H2O=1): 7.8 TO 8.2

SECTION 10 - STABILITY AND REACTIVITY

STABILITY: STABLE UNDER NORMAL TEMPERATURES AND PRESSURE.

DECOMPOSITION:
THERMAL OXIDATIVE DECOMPOSITION OF STEEL CAN PRODUCE METALLIC AND CARBON OXIDES.

INCOMPATIBILITIES:

IRON:
FLUORINE OR PHOSPHORUS: MAY BECOME INCANDESCENT WHEN HEATED.
CHLORINE TRIFLUORIDE: MAY CAUSE INCANDESCENT REACTION.
HYDROGEN PEROXIDE: VIOLENTLY DECOMPOSES ON CONTACT.

TUNGSTEN:

AIR + WIDE RANGE OF OXIDANTS: IGNITES UPON HEATING.

ALKALI, ALKALINE-EARTH METALS WITH HALOCARBONS:
RESULTS IN HEAT- OR IMPACT-SENSITIVE EXPLOSIONS.

BROMINE TRIFLUORIDE: REACTS VIGOROUSLY.

MOLYBDENUM:

BROMINE PENTAFLUORIDE:
INCANDESCENT AT AMBIENT OR SLIGHTLY ELEVATED TEMPERATURES.

BROMINE TRIFLUORIDE, CHLORINE TRIFLUORIDE, LEAD DIOXIDE, NITRYL FLUORIDE,
OR IODINE PENTAFLUORIDE: INCANDESCENT REACTION WHEN HEATED.

FLUORINE: INCANDESCENT REACTION AT 205 DEG. C.

SODIUM PEROXIDE: EXPLOSIVE REACTION AT 240 DEG. C.

POTASSIUM PERCHLORATE: IGNITES AT 330 DEG. C.

CHROMIUM:

AMMONIUM NITRATE: MAY PRODUCE VIOLENT OR EXPLOSIVE REACTION.

CARBON DIOXIDE: CHROMIUM DUST MAY BECOME IGNITABLE AND EXPLOSIVE.

BROMINE PENTAFLUORIDE: MAY CAUSE VIOLENT REACTION.

NITROGEN OXIDE OR SULFUR DIOXIDE:
MAY PRODUCE VIGOROUS REACTION WITH INCANDESCENCE.

VANADIUM:
OXIDANTS, NITRYL FLUORIDE, LITHIUM, CHLORINE, BROMINE TRIFLUORIDE:
VIOLENT REACTION.

COBALT:

AMMONIUM NITRATE + METALS OR BROMINE PENTAFLUORIDE:
REACTS VIOLENTLY AND SOMETIMES EXPLOSIVELY.

HYDRAZINIUM NITRATE: DECOMPOSES EXPLOSIVELY UPON RAPID HEATING.

NITRYL FLUORIDE, ACETYLENE: REACTS INCANDESCENTLY.

SECTION 11 - TOXICOLOGICAL INFORMATION

MOLYBDENUM:
MOLYBDENUM IS AN EYE AND MUCOUS MEMBRANE IRRITANT. INDIVIDUALS WITH A
HISTORY OF KIDNEY, CHRONIC RESPIRATORY, OR LIVER DISEASE MAY BE AT
INCREASED RISK FROM EXPOSURE.

RAT INTRAPERITONEAL LDLO: 114 MG/KG.

RABBIT INTRATRACHEAL LDLO: 70 MG/KG

CHROMIUM:
CARCINOGENIC STATUS:
THERE IS EVIDENCE OF INCREASED INCIDENCE OF LUNG CANCER AMONG CHROMIUM
ALLOY WORKERS. HOWEVER, ACCORDING TO IARC, THE CHROMIUM COMPOUNDS
RESPONSIBLE CANNOT BE SPECIFIED.

COBALT:
CARCINOGENIC STATUS:
THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) LISTS COBALT AND
COBALT COMPOUNDS AS CATEGORY 2B CARCINOGENS (POSSIBLY CARCINOGENIC TO
HUMANS). COBALT FUMES OR DUST MAY CAUSE PULMONARY, SKIN, OR EYE IRRITATION.
COBALT MAY BE A SENSITIZING AGENT FOR SKIN AND RESPIRATORY SYSTEM. CHRONIC
EXPOSURE MAY AFFECT THE HEART, PANCREAS, THYROID GLAND, OR BONE MARROW.

RAT ORAL LDLO: 1500 MG/KG.
RABBIT ORAL LDLO: 20 MG/KG

RAT INTRAPERITONEAL LDLO: 250 MG/KG
RABBIT INTRATRACHEAL LDLO: 100 MG/KG

RAT INTRAVENOUS LDLO: 100 MG/KG

SECTION 12 - ECOLOGICAL INFORMATION

NO DATA ARE AVAILABLE.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:
THIS IS A VALUABLE MATERIAL THAT SHOULD BE SENT TO AN APPROPRIATE
RECLAMATION FACILITY IF AVAILABLE. IF MATERIAL CANNOT BE SENT TO A
RECLAMATION FACILITY, DISPOSAL SHOULD BE MADE IN COMPLIANCE WITH FEDERAL,
PROVINCIAL/STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14 - TRANSPORT INFORMATION

MAY BE CLASSIFIED AS A HAZARDOUS SUBSTANCE WHEN IT IS IN A QUANTITY, IN ONE
PACKAGE, IN WHICH INDIVIDUAL, REGULATED COMPONENTS EQUAL OR EXCEED THE
REPORTABLE QUANTITIES ESTABLISHED BY THE DEPARTMENT OF TRANSPORTATION.

SECTION 15 - REGULATORY INFORMATION

SOME INGREDIENTS IN GREENFIELD PRODUCTS, INCLUDING COBALT, NICKEL, COPPER,
CHROMIUM AND CHROMIUM COMPOUNDS, ARE SUBJECT TO THE REQUIREMENTS OF SECTION
313 OF TITLE III OF SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986
AND 40 CFR PART 372.

SECTION 16 - OTHER INFORMATION

ALTHOUGH GREENFIELD INDUSTRIES AND KENAMETAL INC. HAVE ATTEMPTED TO
PROVIDE CURRENT AND ACCURATE INFORMATION HEREIN, GREENFIELD INDUSTRIES AND
KENAMETAL INC. MAKE NO REPRESENTATIONS REGARDING THE ACCURACY OR
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