



MATERIAL SAFETY DATA SHEETS.

GLOSSARY

ACGIH	AMERICAN CONFERENCE OF GOVERNMENT INDUSTRIAL HYGIENISTS
CAS	CHEMICAL ABSTRACTS SERVICE REGISTRY NUMBER
MSDS	MATERIAL SAFETY DATA SHEETS
NIOSH	NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PEL	PERMISSIBLE EXPOSURE LIMIT
PPM	PARTS PER MILLION
TDG	TRANSPORTATION OF DANGEROUS GOODS
TLV	8 HOUR AVERAGE THRESHOLD LIMIT VALUE
WHMIS	WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM

LD50 OF MATERIAL

LD = LETHAL DOSE; THE DOSE OF THE MATERIAL THAT CAUSES DEATH OF 50% OF A GROUP OF TEST ANIMALS WHEN GIVEN A SINGLE DOSE. THE LD50 CAN BE MEASURED FOR ANY ROUTE OF EXPOSURE BUT THE DERMAL (SKIN APPLICATION) AND THE ORAL VALUES ARE MOST RELEVANT TO THE WORK PLACE.

LC50 OF MATERIAL

LC = LETHAL CONCENTRATION; THE CONCENTRATION OF A MATERIAL IN AIR WHICH CAUSES THE DEATH OF 50% OF A GROUP OF TEST ANIMALS WHEN GIVEN OVER A SET PERIOD OF TIME, USUALLY 1 TO 4 HOURS. THE LC50 APPLIES TO MATERIALS THAT CAN BE INHALED.

DISCLAIMER

THE INFORMATION IN THESE MSDS WERE OBTAINED FROM SOURCES WHICH WE BELIEVE ARE RELIABLE, HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY REPRESENTATION OR WARRANTY EXPRESS OR IMPLIED REGARDING THE ACCURACY OR CORRECTNESS.

THE CONDITIONS OR METHODS OF HANDLING, STORAGE, USE AND DISPOSAL OF THE PRODUCT ARE BEYOND OUR KNOWLEDGE. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT



PRODUCT MANUAL

MATERIAL SAFETY DATA SHEETS.

SECTION I - MATERIAL IDENTIFICATION AND USE

MATERIAL NAME:	HR & CF CARBON STEELS HR & CF ALLOY STEELS
CARBON AND ALLOY STEEL BAR, HOLLOW BAR & PLATE	

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	% WEIGHT	EXPOSURE LIMITS		LD50/LC50 ROUTE
			OSHA PEL (MG/M3)	ACGIH TVL (MG/M3)	
IRON (FE)	7439-89-6	95-99	10 AS OXIDE FUME	5 AS IRON OXIDE	NOT APPLICABLE
ALLOYING ELEMENTS					
ALUMINUM (AL)	7429-90-5	< 2	15 DUST	10 (DUST)	NOT APPLICABLE
CARBON (C)	7440-44-0	< 2	NONE LISTED	NONE LISTED	NOT APPLICABLE
CHROMIUM (CR)	7440-47-3	< 2	1.0 AS CHROME	.5 METAL	NOT APPLICABLE
COBALT (CO)	7440-48-4	8 MAX.	0.1	.05 AS FUME	NOT APPLICABLE
COPPER (CU)	7440-50-8	< 1	0.2	1 AS DUST AND MIST	NOT APPLICABLE
LEAD (PB)	7439-92-1	< .35	0.05	.15 DUST AND FUME	NOT APPLICABLE
MANGANESE (MN)	7439-96-5	< 2.5	5 MANGANESE	5 AS DUST; 1 AS FUME	LD50 9MG/KG
MOLYBDENUM (MO)	7439-98-7	< 2	15 AS INSOLUBLE COMPD.	10 AS INSOLUBLE COMPD	NOT APPLICABLE
NICKEL (NI)	7440-02-0	< 1	1	1	NOT APPLICABLE
PHOSPHORUS (P)	7723-14-0	0.15 MAX.	0.1 AS PHOSPHOR	0.1 AS PHOSPHOR	NOT APPLICABLE
SILICON (SI)	7440-21-3	< 2.3	15 AS DUST	10 AS DUST	NOT APPLICABLE
SULFUR (S)	7704-34-9	< 1	13 SULFUR DIOXIDE	5 SULFUR DIOXIDE	NOT APPLICABLE
TUNGSTEN (W).	7440-33-7	0-18	NONE LISTED	5 INSOLUBLE COMPD	NOT APPLICABLE
VANADIUM (V)	1314-62-1	< 1	0.5 DUST; 0.1 FUME	0.05 DUST AND FUME	NOT APPLICABLE
ZINC (ZN) COATING	1314-13-2	10 MAX.	5.0 AS FUME	5.0 AS FUME	NOT APPLICABLE

NOTE: THE ABOVE LISTING IS A SUMMARY OF ELEMENTS USED IN ALLOYING STEEL. VARIOUS GRADES OF STEEL WILL CONTAIN DIFFERENT COMBINATIONS OF THESE ELEMENTS. TRACE ELEMENTS MAY ALSO BE PRESENT IN MINUTE AMOUNTS. NO PERMISSIBLE EXPOSURE LIMITS (PEL) OR THRESH OLDS LIMIT (TVL) EXIST FOR STEEL.

SECTION III - PHYSICAL DATA

PHYSICAL STATE	ODOR AND APPEARANCE	ODOR THRESHOLD (PPM)	SPECIFIC GRAVITY
GAS [] LIQUID [] SOLID [X]	SILVER / GRAY METALLIC	NOT APPLICABLE	7.6-7.8
VAPOR PRESSURE (MM)	VAPOR DENSITY (AIR = 1)	EVAPORATION RATE	BOILING POINT (°C)
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
SOLUBILITY IN WATER (20°C)	% VOLATILE (BY VOLUME)	pH	COEFFICIENT OF WATER/OIL DISTRIBUTION
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE

SECTION IV FIRE AND EXPLOSION DATA

FLAMMABILITY	IF YES, UNDER WHICH CONDITION:	MEANS OF EXTINCTION
YES: [] NO: [X]		NOT APPLICABLE
SPECIAL PROCEDURES	FLASHPOINT (°C) AND METHOD	UPPER EXPLOSION LIMIT (% BY VOLUME)
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
LOWER EXPLOSION LIMIT (% BY VOLUME)	AUTO IGNITION TEMPERATURE (°C)	HAZARDOUS COMBUSTION PRODUCTS
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
EXPLOSION DATA SENSITIVITY	RATE OF BURNING	EXPLOSIVE POWER
TO CHEMICAL IMPACT	NO	NOT APPLICABLE
	NOT APPLICABLE	SENSITIVITY TO STATIC DISCHARGE
		NO

SECTION V - REACTIVITY DATA

CHEMICAL STABILITY	IF NO, UNDER WHICH CONDITION
YES: [X] NO: []	
INCOMPATIBILITY TO OTHER SUBSTANCES	IF SO, WHICH ONES ?
YES: [X] NO: []	CONTACT WITH MINERAL ACIDS WILL RELEASE HYDROGEN GAS
REACTIVITY AND UNDER WHAT CONDITIONS	HAZARDOUS DECOMPOSITION PRODUCTS
NOT APPLICABLE	NOT APPLICABLE



PRODUCT MANUAL

MATERIAL SAFETY DATA SHEETS.

SECTION V I - TOXICOLOGICAL PROPERTIES OF PRODUCTS

ROUTE OF ENTRY [] SKIN CONTACT [x] SKIN ABSORPTION [] EYE CONTACT [x] INHALATION ACUTE [x] INHALATION CHRONIC [x] INGESTION

STEEL PRODUCTS IN A NORMAL STATE POSE NO INHALATION, INGESTION OR CONTACT HAZARD, HOWEVER THESE MAY OCCUR WITH BURNING, WELDING OR GRINDING OPERATIONS, PROLONGED CONTACT WITH COATING MATERIALS MAY CAUSE SKIN IRRITATION AND/OR DERMATITIS.

EFFECTS OF ACUTE EXPOSURE TO PRODUCT

NONE TO SHIPPED PRODUCT, WELDING OR BURNING OF MATERIAL WILL GENERATE METAL FUMES, INHALATION OVER EXPOSURE TO FUMES MAY CAUSE FLU-LIKE SYMPTOMS (I.E. CHILLS, FEVER) CALLED METAL FUME FEVER, EYE, NOSE OR THROAT IRRITATION. EYE IRRITATION AS A RESULT OF CONTACT WITH LIME COATING.

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT

NONE TO SHIPPED PRODUCT, WELDING, BURNING, GRINDING GENERATES METAL FUME OR OXIDE DUST. PROLONGED INHALATION OVEREXPOSURE TO DUST OR FUME (IRON OXIDE) MAY RESULT IN THE ACCUMULATION OF IRON OXIDE DUST IN THE LUNGS; A CONDITION KNOWN AS SIDEROSIS, WITH FEW OR NO SYMPTOMS. CERTAIN NICKEL AND CHROMIUM COMPOUNDS HAVE BEEN LISTED WITH (ARC AS NASAL) AND LUNG CARCINOGENS, PROLONGED SKIN CONTACT MAY CAUSE DERMATITIS IN SENSITIVE INDIVIDUALS (FROM NICKEL, CHROMIUM & COBALT CONTENT IN STEEL). PROLONGED OVEREXPOSURE TO COBALT DUST MAY RESULT IN AN ASTHMA-LIKE CONDITION (COUGH, SHORTNESS OF BREATH).

LD50 OF PRODUCT (SPECIES AND ROUTE)	IRRITANCY OF PRODUCT	EXPOSURE LIMITS OF PRODUCT
9 MG/KG (ORAL-RAT)	NOT APPLICABLE	SEE SECTION 11
LC50 OF PRODUCT (SPECIFY SPECIES)	SENSITIZATION TO PRODUCT	SYNERGISTIC MATERIALS
NOT AVAILABLE	NO KNOWN EFFECTS	NO KNOWN EFFECTS
CARCINOGENICITY [x]	REPRODUCTIVE EFFECTS []	TERATOGENICITY []
SEE ABOVE	NO KNOWN EFFECTS	NO KNOWN EFFECTS
		MUTAGENICITY []
		NO KNOWN EFFECTS

SECTION V II - PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

DEPENDS ON THE PROCESS BEING PERFORMED ON THE MATERIAL. EACH OPERATION MUST BE ASSESSED FOR SUITABLE PROTECTIVE EQUIPMENT.

GLOVES (SPECIFY)	RESPIRATORY (SPECIFY)	EYE (SPECIFY)	FOOTWEAR (SPECIFY)
LEATHER FACED OR EQUIVALENT	SEE BELOW	SAFETY GLASSES OR FACE SHIELD AS REQUIRED	SAFETY SHOES/BOOTS AS REQUIRED
CLOTHING (SPECIFY)	OTHER (SPECIFY)		
NOT APPLICABLE	RESPIRATORY-NIOSH APPROVED AIR PURIFYING FOR DUST MIST OR FUME WHERE REQUIRED		

ENGINEERING CONTROLS (E.G. VENTILATION, ENCLOSED PROCESS, SPECIFY)

GENERAL OR LOCAL VENTILATION DURING WELDING, BURNING, OR GRINDING.

LEAK AND SPILL PROCEDURE	WASTE DISPOSAL	HANDLING PROCEDURES AND EQUIPMENT
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
STORAGE REQUIREMENT	SPECIAL SHIPPING INFORMATION	
NOT APPLICABLE	NOT APPLICABLE	

SECTION V III - FIRST AID MEASURES

SKIN	WASH AFFECTED AREA WITH SOAP AND WATER. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS
EYE	FOR IRRITATION FROM COATING MATERIALS, FLUSH EYES WITH PLENTY OF WATER WHILE HOLDING EYE LIDS OPEN. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS
INHALATION	FOR OVEREXPOSURE TO METAL FUMES, REMOVE TO FRESH AIR. SEEK MEDICAL ATTENTION.
INGESTION	NOT APPLICABLE
GENERAL ADVISE	SOME OF THE STEEL GRADES MAY HAVE AN OIL COATING APPLIED FOR RUST PREVENTION PURPOSES OR A LIME COATING. THE OIL IS 95-98% PETROLEUM OIL. USE IMPERVIOUS GLOVES WHEN HANDLING TO PREVENT SKIN IRRITATION

SECTION I X

PREPARED BY	PHONE NUMBER	DATE
VANGUARD STEEL LTD	(905) 821-1100	September 2006



PRODUCT MANUAL

MATERIAL SAFETY DATA SHEETS.

SECTION I - MATERIAL IDENTIFICATION AND USE

MATERIAL NAME:	HOT ROLLED TOOL STEELS GROUND TOOL STEELS
ALLOY TOOL STEELS	
BAR, HOLLOW BAR & PLATE	

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	% WEIGHT	EXPOSURE LIMITS		LD50/LC50 ROUTE
			OSHA PEL (MG/M3)	ACGIH TVL (MG/M3)	
IRON (FE)	7439-89-6	95-99	10 (OXIDE FUME)	5 (AS IRON OXIDE)	NOT APPLICABLE
ALLOYING ELEMENTS					
CHROMIUM (CR)	7440-47-3	25	1 METAL	.5 METAL	NOT APPLICABLE
COBALT (CO)	7440-48-4	8	0.1	0.05	NOT APPLICABLE
MANGANESE (MN)	7439-96-5	15	C 5 DUST	C 5 AS DUST; 1 AS FUME	LD50 9MG/KG
MOLYBDENUM (MO)	7439-98-7	5	15	10	NOT APPLICABLE
NICKEL (NI)	7440-02-0	5	1 METAL	1 METAL	NOT APPLICABLE
SILICON (SI)	7440-21-3	2.5	5	10	NOT APPLICABLE
VANADIUM (V)	1314-62-1	5	C .5	C .05	NOT APPLICABLE

NOTE: THE ABOVE LISTING IS A SUMMARY OF ELEMENTS USED IN ALLOYING STEEL. VARIOUS GRADES OF STEEL WILL CONTAIN DIFFERENT COMBINATIONS OF THESE ELEMENTS. TRACE ELEMENTS MAY ALSO BE PRESENT IN MINUTE AMOUNTS. NO PERMISSIBLE EXPOSURE LIMITS (PEL) OR THRESH OLDS LIMIT (TVL) EXIST FOR STEEL.

SECTION III - PHYSICAL DATA

PHYSICAL STATE	ODOR AND APPEARANCE	ODOR THRESHOLD (PPM)	SPECIFIC GRAVITY
GAS [] LIQUID [] SOLID [X]	SILVER / GRAY METALLIC	NOT APPLICABLE	7.6-7.8
VAPOR PRESSURE (MM)	VAPOR DENSITY (AIR = 1)	EVAPORATION RATE	BOILING POINT (°C)
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
SOLUBILITY IN WATER (20°C)	% VOLATILE (BY VOLUME)	pH	COEFFICIENT OF WATER/OIL DISTRIBUTION
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE

SECTION IV FIRE AND EXPLOSION DATA

FLAMMABILITY	IF YES, UNDER WHICH CONDITION:	MEANS OF EXTINGUISHMENT	
YES: [] NO: [X]		NOT APPLICABLE	
SPECIAL PROCEDURES	FLASHPOINT (°C) AND METHOD	UPPER EXPLOSION LIMIT (% BY VOLUME)	
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
LOWER EXPLOSION LIMIT (% BY VOLUME)	AUTO IGNITION TEMPERATURE (°C)	HAZARDOUS COMBUSTION PRODUCTS	
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
EXPLOSION DATA SENSITIVITY TO CHEMICAL IMPACT	RATE OF BURNING	EXPLOSIVE POWER	SENSITIVITY TO STATIC DISCHARGE
NO	NOT APPLICABLE	NOT APPLICABLE	NO

SECTION V - REACTIVITY DATA

CHEMICAL STABILITY	IF NO, UNDER WHICH CONDITION
YES: [X] NO: []	
INCOMPATIBILITY TO OTHER SUBSTANCES	IF SO, WHICH ONES ?
YES: [X] NO: []	CONTACT WITH MINERAL ACIDS WILL RELEASE HYDROGEN GAS
REACTIVITY AND UNDER WHAT CONDITIONS	HAZARDOUS DECOMPOSITION PRODUCTS
NOT APPLICABLE	NOT APPLICABLE



MATERIAL SAFETY DATA SHEETS.

SECTION V I - TOXICOLOGICAL PROPERTIES OF PRODUCTS

ROUTE OF ENTRY [] SKIN CONTACT [x] SKIN ABSORPTION [] EYE CONTACT [x] INHALATION ACUTE [x] INHALATION CHRONIC [x] INGESTION			
STEEL PRODUCTS IN A NORMAL STATE POSE NO INHALATION, INGESTION OR CONTACT HAZARD, HOWEVER THESE MAY OCCUR WITH BURNING, WELDING OR GRINDING OPERATIONS, PROLONGED CONTACT WITH COATING MATERIALS MAY CAUSE SKIN IRRITATION AND/OR DERMATITIS.			
EFFECTS OF ACUTE EXPOSURE TO PRODUCT			
NONE TO SHIPPED PRODUCT, WELDING OR BURNING OF MATERIAL WILL GENERATE METAL FUMES, INHALATION OVER EXPOSURE TO FUMES MAY CAUSE FLU-LIKE SYMPTOMS (I.E. CHILLS, FEVER) CALLED METAL FUME FEVER, EYE, NOSE OR THROAT IRRITATION. EYE IRRITATION AS A RESULT OF CONTACT WITH LIME COATING.			
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT			
NONE TO SHIPPED PRODUCT, WELDING, BURNING, GRINDING GENERATES METAL FUME OR OXIDE DUST. PROLONGED INHALATION OVEREXPOSURE TO DUST OR FUME (IRON OXIDE) MAY RESULT IN THE ACCUMULATION OF IRON OXIDE DUST IN THE LUNGS; A CONDITION KNOWN AS SIDEROSIS, WITH FEW OR NO SYMPTOMS. CERTAIN NICKEL AND CHROMIUM COMPOUNDS HAVE BEEN LISTED WITH (ARC AS NASAL) AND LUNG CARCINOGENS, PROLONGED SKIN CONTACT MAY CAUSE DERMATITIS IN SENSITIVE INDIVIDUALS (FROM NICKEL, CHROMIUM & COBALT CONTENT IN STEEL). PROLONGED OVEREXPOSURE TO COBALT DUST MAY RESULT IN AN ASTHMA-LIKE CONDITION (COUGH, SHORTNESS OF BREATH).			
LD50 OF PRODUCT (SPECIES AND ROUTE)	IRRITANCY OF PRODUCT	EXPOSURE LIMITS OF PRODUCT	
9 MG/KG (ORAL-RAT)	NOT APPLICABLE	SEE SECTION 11	
LC50 OF PRODUCT (SPECIFY SPECIES)	SENSITIZATION TO PRODUCT	SYNERGISTIC MATERIALS	
NOT AVAILABLE	NO KNOWN EFFECTS	NO KNOWN EFFECTS	
CARCINOGENICITY [x]	REPRODUCTIVE EFFECTS []	TERATOGENICITY []	MUTAGENICITY []
SEE ABOVE	NO KNOWN EFFECTS	NO KNOWN EFFECTS	NO KNOWN EFFECTS

SECTION V II - PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT			
DEPENDS ON THE PROCESS BEING PERFORMED ON THE MATERIAL. EACH OPERATION MUST BE ASSESSED FOR SUITABLE PROTECTIVE EQUIPMENT.			
GLOVES (SPECIFY)	RESPIRATORY (SPECIFY)	EYE (SPECIFY)	FOOTWEAR (SPECIFY)
LEATHER FACED OR EQUIVALENT	SEE BELOW	SAFETY GLASSES OR FACE SHIELD AS REQUIRED	SAFETY SHOES/BOOTS AS REQUIRED
CLOTHING (SPECIFY)	OTHER (SPECIFY)		
NOT APPLICABLE	RESPIRATORY-NIOSH APPROVED AIR PURIFYING FOR DUST MIST OR FUME WHERE REQUIRED		
ENGINEERING CONTROLS (E.G. VENTILATION, ENCLOSED PROCESS, SPECIFY)			
GENERAL OR LOCAL VENTILATION DURING WELDING, BURNING, OR GRINDING.			
LEAK AND SPILL PROCEDURE	WASTE DISPOSAL	HANDLING PROCEDURES AND EQUIPMENT	
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
STORAGE REQUIREMENT	SPECIAL SHIPPING INFORMATION		
NOT APPLICABLE	NOT APPLICABLE		

SECTION V III - FIRST AID MEASURES

SKIN	WASH AFFECTED AREA WITH SOAP AND WATER. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS
EYE	FOR IRRITATION FROM COATING MATERIALS, FLUSH EYES WITH PLENTY OF WATER WHILE HOLDING EYE LIDS OPEN. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS
INHALATION	FOR OVEREXPOSURE TO METAL FUMES, REMOVE TO FRESH AIR. SEEK MEDICAL ATTENTION.
INGESTION	NOT APPLICABLE
GENERAL ADVISE	SOME OF THE STEEL GRADES MAY HAVE AN OIL COATING APPLIED FOR RUST PREVENTION PURPOSES OR A LIME COATING. THE OIL IS 95-98% PETROLEUM OIL. USE IMPERVIOUS GLOVES WHEN HANDLING TO PREVENT SKIN IRRITATION

SECTION I X

PREPARED BY	PHONE NUMBER	DATE
VANGUARD STEEL LTD	(905) 821-1100	September 2006



MATERIAL SAFETY DATA SHEETS.

SECTION I - MATERIAL IDENTIFICATION AND USE

MATERIAL NAME:	CHROME PLATED
CHROME PLATED - CARBON STEEL	1045, 1050

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	% WEIGHT	EXPOSURE LIMITS		LD50/LC50 ROUTE
			OSHA PEL (MG/M3)	ACGIH TVL (MG/M3)	
IRON (FE)	7439-89-6	95-99	10 AS OXIDE FUME	5 AS IRON OXIDE	NOT APPLICABLE
ALLOYING ELEMENTS					
ALUMINUM (AL)	7429-90-5	< 2	15 DUST	10 (DUST)	NOT APPLICABLE
CARBON (C)	7440-44-0	< 2	NONE LISTED	3.5 AS CARBON BLACK	NOT APPLICABLE
CHROMIUM (CR.)	7440-47-3	< 1	1 (CR. & INSOL. SALT)	.5 METAL	NOT APPLICABLE
COBALT (CO)	7440-48-4	< 1	0.1	.05 AS FUME	NOT APPLICABLE
COPPER (CU)	7440-50-8	< 1	0.2	1 AS DUST AND MIST	NOT APPLICABLE
BISMUTH (BL)	7440-69-9	< 1	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
MANGANESE (MN)	7439-96-5	< 2	5	5 AS DUST; 1 AS FUME	LD50 9MG/KG
MOLYBDENUM (MO)	7439-98-7	< 1	5	10 (INSOL. SALTS)	NOT APPLICABLE
NICKEL (NI)	7440-02-0	< 1	1.0	1.0	NOT APPLICABLE
PHOSPHORUS (P)	7723-14-0	< 1	0.1	0.1	NOT APPLICABLE
SILICON (SI)	7440-21-3	< 1	15 DUST	10 TOTAL DUST	NOT APPLICABLE
SULFUR (S)	7704-34-9	< 1	13 SULFUR DIOXIDE	5 SULFUR DIOXIDE	NOT APPLICABLE
VANADIUM (V)	7440-62-2	< 1	0.5 DUST; 0.1 FUME	0.05 DUST	NOT APPLICABLE
METAL COATING					
CHROMIUM (CR.)	7440-47-3	> 98	1 (CR. & INSOL. SALTS)	0.5	NOT APPLICABLE

NOTE: THE ABOVE LISTING IS A SUMMARY OF ELEMENTS USED IN ALLOYING STEEL. VARIOUS GRADES OF STEEL WILL CONTAIN DIFFERENT COMBINATIONS OF THESE ELEMENTS. TRACE ELEMENTS MAY ALSO BE PRESENT IN MINUTE AMOUNTS. NO PERMISSIBLE EXPOSURE LIMITS (PEL) OR THRESH OLDS LIMIT (TVL) EXIST FOR STEEL.

SECTION III - PHYSICAL DATA

PHYSICAL STATE	ODOR AND APPEARANCE		ODOR THRESHOLD (PPM)	SPECIFIC GRAVITY
GAS [] LIQUID [] SOLID [X]	SILVER / GRAY METALLIC		NOT APPLICABLE	7.6-7.8
VAPOR PRESSURE (MM)	VAPOR DENSITY (AIR = 1)	EVAPORATION RATE	BOILING POINT (°C)	FREEZING POINT (°C)
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	MELTING PT 1530°C
SOLUBILITY IN WATER (20°C)	% VOLATILE (BY VOLUME)	pH	COEFFICIENT OF WATER/OIL DISTRIBUTION	
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	

SECTION IV FIRE AND EXPLOSION DATA

FLAMMABILITY	IF YES, UNDER WHICH CONDITION:		MEANS OF EXTINCTION
YES: [] NO: [X]			NOT APPLICABLE
SPECIAL PROCEDURES	FLASHPOINT (°C) AND METHOD	UPPER EXPLOSION LIMIT (% BY VOLUME)	
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
LOWER EXPLOSION LIMIT (% BY VOLUME)	AUTO IGNITION TEMPERATURE (°C)	HAZARDOUS COMBUSTION PRODUCTS	
NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
EXPLOSION DATA SENSITIVITY TO CHEMICAL IMPACT	RATE OF BURNING	EXPLOSIVE POWER	SENSITIVITY TO STATIC DISCHARGE
NO	NOT APPLICABLE	NOT APPLICABLE	NO

SECTION V - REACTIVITY DATA

CHEMICAL STABILITY	IF NO, UNDER WHICH CONDITION	
YES: [X] NO: []		
INCOMPATIBILITY TO OTHER SUBSTANCES	IF SO, WHICH ONES ?	
YES: [X] NO: []	CONTACT WITH MINERAL ACIDS WILL RELEASE HYDROGEN GAS	
REACTIVITY AND UNDER WHAT CONDITIONS	HAZARDOUS DECOMPOSITION PRODUCTS	
NOT APPLICABLE	NOT APPLICABLE	



MATERIAL SAFETY DATA SHEETS.

SECTION V I - TOXICOLOGICAL PROPERTIES OF PRODUCTS

ROUTE OF ENTRY [] SKIN CONTACT [X] SKIN ABSORPTION [] EYE CONTACT [X] INHALATION ACUTE [X] INHALATION CHRONIC [X] INGESTION

STEEL PRODUCTS IN A NORMAL STATE POSE NO INHALATION, INGESTION OR CONTACT HAZARD, HOWEVER THESE MAY OCCUR WITH BURNING, WELDING OR GRINDING OPERATIONS, PROLONGED CONTACT WITH COATING MATERIALS MAY CAUSE SKIN IRRITATION AND/OR DERMATITIS.

EFFECTS OF ACUTE EXPOSURE TO PRODUCT
NONE TO SHIPPED PRODUCT, WELDING OR BURNING OF MATERIAL WILL GENERATE METAL FUMES, INHALATION OVER EXPOSURE TO FUMES MAY CAUSE FLU-LIKE SYMPTOMS (I.E. CHILLS, FEVER) CALLED METAL FUME FEVER, EYE, NOSE OR THROAT IRRITATION. EYE IRRITATION AS A RESULT OF CONTACT WITH LIME COATING.

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT
NONE TO SHIPPED PRODUCT, WELDING, BURNING, GRINDING GENERATES METAL FUME OR OXIDE DUST. PROLONGED INHALATION OVEREXPOSURE TO DUST OR FUME (IRON OXIDE) MAY RESULT IN THE ACCUMULATION OF IRON OXIDE DUST IN THE LUNGS; A CONDITION KNOWN AS SIDEROSIS, WITH FEW OR NO SYMPTOMS. CERTAIN NICKEL AND CHROMIUM COMPOUNDS HAVE BEEN LISTED WITH (ARC AS NASAL) AND LUNG CARCINOGENS, PROLONGED SKIN CONTACT MAY CAUSE DERMATITIS IN SENSITIVE INDIVIDUALS (FROM NICKEL, CHROMIUM & COBALT CONTENT IN STEEL). PROLONGED OVEREXPOSURE TO COBALT DUST MAY RESULT IN AN ASTHMA-LIKE CONDITION (COUGH, SHORTNESS OF BREATH).

Table with 3 columns: LD50 OF PRODUCT (SPECIES AND ROUTE), IRRITANCY OF PRODUCT, EXPOSURE LIMITS OF PRODUCT. Rows include 9 MG/KG (ORAL-RAT), LC50 OF PRODUCT (SPECIFY SPECIES), CARCINOGENICITY [X], REPRODUCTIVE EFFECTS [], TERATOGENICITY [], MUTAGENICITY []

SECTION V II - PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT
DEPENDS ON THE PROCESS BEING PERFORMED ON THE MATERIAL. EACH OPERATION MUST BE ASSESSED FOR SUITABLE PROTECTIVE EQUIPMENT.

Table with 4 columns: GLOVES (SPECIFY), RESPIRATORY (SPECIFY), EYE (SPECIFY), FOOTWEAR (SPECIFY). Rows include LEATHER FACED OR EQUIVALENT, CLOTHING (SPECIFY), OTHER (SPECIFY)

ENGINEERING CONTROLS (E.G. VENTILATION, ENCLOSED PROCESS, SPECIFY)
GENERAL OR LOCAL VENTILATION DURING WELDING, BURNING, OR GRINDING.

Table with 3 columns: LEAK AND SPILL PROCEDURE, WASTE DISPOSAL, HANDLING PROCEDURES AND EQUIPMENT. Rows include STORAGE REQUIREMENT, SPECIAL SHIPPING INFORMATION

SECTION V III - FIRST AID MEASURES

Table with 2 columns: SKIN, EYE, INHALATION, INGESTION, GENERAL ADVISE. Rows include WASH AFFECTED AREA WITH SOAP AND WATER, FOR IRRITATION FROM COATING MATERIALS, FOR OVEREXPOSURE TO METAL FUMES, NOT APPLICABLE, SOME OF THE STEEL GRADES MAY HAVE AN OIL COATING APPLIED FOR RUST PREVENTION PURPOSES

SECTION I X

Table with 3 columns: PREPARED BY, PHONE NUMBER, DATE. Rows include VANGUARD STEEL LTD, (905) 821-1100, September 2006