

# MATERIAL SAFETY DATA SHEET

## STAINLESS STEEL

VERSION DATE 1/5/98

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### SECTION 1

### PRODUCT IDENTIFICATION

COMPANY NAME WHO SENT MSDS ..... HARRIS WELCO. DIV. OF J.W. HARRIS CO., INC.  
COMPANY ADDRESS ..... 1051 YORK RD  
KINGS MOUNTAIN, NC 28086  
EMERGENCY PHONE NUMBER ..... (800)-424-9300  
MSDS VERSION NUMBER ..... 3  
TRADE NAME ..... STAINLESS STEEL AWS: 308, 308L, 308H, 308LSI, 309, 309L, 309LSI 310, 312, 316,  
316L, 316LSI, 317, 317L, 347, 410, 320, 330, 410NiMo, 630, 505, 502

HAZARD RATING (HMIS) ..... HEALTH-3  
FLAMMABILITY-0  
REACTIVITY-0  
OTHER-2  
HMIS DESIGNATED KEY ..... 4-SEVERE HAZARD  
3-SERIOUS HAZARD  
2-MODERATE HAZARD  
1-SLIGHT HAZARD  
0-MINIMAL HAZARD

### SECTION 2

### HAZARDOUS COMPONENTS

MATERIAL	% BY WEIGHT	CAS NUMBER	ACGIH TLV (Mg/M3)	SEC 313
IRON	BALANCE	7439-89-6	10 AS e2O3	NA
CHROMIUM	11.5-37.0	7440-47-3	.05 CHROMIUM VI	YES
NICKEL	.06-37.0	7440-02-0	1	YES
MANGANESE	0.6-14.0	7439-96-5	1	YES
SILICON	.30-5.0	7440-21-3	3 AS SiO2	NA
MOLYBDENUM	.05-6.0	7439-98-7	10	NA
CARBON	0-1.0%	7440-44-0	2	NA
PHOSPHOROS	0-0.50%	7723-14-0	0.02-0.1	NA
SULPHUR	0-0.50	7704-34-9	NA	NA
NITROGEN	0-0.50	7727-37-9	NA	NA
COPPER	0-5.0	7440-50-8	1	NA
NIOBIUM	0-1.0	7440-03-1	NA	NA

### SECTION 3

### PHYSICAL PROPERTIES

BOILING POINT ..... NA  
MELTING POINT ..... NA  
VAPOR PRESSURE ..... NA  
VAPOR DENSITY (AIR=1) ..... NA  
SOLUBILITY IN WATER ..... NA  
SPECIFIC GRAVITY ..... NA  
EVAPORATION RATE ..... NA  
APPEARANCE AND ODOR ..... BARE FILLER METALS ARE SOLID WIRE, SHINE SILVER APPEARANCE

### SECTION 4

### FIRE AND EXPLOSION DATA

FLASH POINT ..... NONFLAMMABLE  
EXTINGUISHING MEDIA ..... SEE BELOW  
SPECIAL PROCEDURES ..... SEE BELOW  
UNUSUAL HAZARDS ..... WELDING ARC AND SPARKS CAN IGNITE COMBUSTIBLES AND FLAMMABLES.  
REFER TO AMERICAN NATIONAL STANDARD Z49.1 FOR FIRE PREVENTION DURING  
THE USE OF WELDING AND ALLIED PROCEDURES

### SECTION 5

### REACTIVITY DATA

STABILITY ..... STABLE  
CONDITIONS TO AVOID ..... NONE UNLESS OTHERWISE SPECIFIED  
HAZARDOUS POLYMERIZATION ..... NA  
INCOMPATIBILITY ..... NONE  
HAZARDOUS DECOMPOSITION PRODUCTS ..... THE COMPOSITION AND QUALITY OF WELDING FUMES AND GASES ARE  
DEPENDENT UPON THE METAL BEING WELDED, THE PROCESS, PROCEDURE AND  
ELECTRODES USED. OTHER CONDITIONS WHICH ALSO INFLUENCE THE  
COMPOSITION AND QUANTITY OF FUMES AND GASES TO WHICH WORKERS MAY  
BE EXPOSED INCLUDE: COATINGS ON METAL BEING WELDED (SUCH AS PAINT,  
PLATING, OR GALVANIZING), THE NUMBER OF WELDERS AND VOLUME OF THE  
WORK AREA, THE QUALITY AND AMOUNT OF VENTILATION, THE POSITION OF  
WELDER'S HEAD WITH RESPECT TO FUME PLUME, AND THE PRESENCE OF  
CONTAMINANTS IN ATMOSPHERE (CHLORINATED HYDROCARBON VAPORS FROM  
CLEANING AND DEGREASING ACTIVITIES). WHEN ELECTRODE IS CONSUMED,  
THE FUME AND GAS DECOMPOSITION PRODUCTS GENERATED ARE DIFFERENT  
IN PERCENT AND FORM FROM INGREDIENTS IN SECTION 2. FUME AND GAS  
DECOMPOSITION PRODUCTS, AND NOT INGREDIENTS IN ELECTRODE, ARE  
IMPORTANT. CONCENTRATION OF GIVEN FUME OR GAS COMPONENT MAY  
DECREASE OR INCREASE BY MANY TIMES ORIGINAL CONCENTRATION. NEW  
COMPOUNDS IN ELECTRODE MAY FORM. DECOMPOSITION PRODUCTS OF  
NORMAL OPERATION INCLUDE THOSE ORIGINATING FROM VOLATILIZATION,  
REACTION, OR OXIDATION OF MATERIALS IN SECTION 2, PLUS THOSE FROM  
BASE METAL AND COATING, ETC., AS NOTED ABOVE. REASONABLY EXPECTED  
FUME CONSTITUENTS OF PRODUCT COULD INCLUDE PRIMARILY OXIDES OF  
IRON; SECONDARILY OXIDES OF CHROMIUM, NICKEL, MANGANESE, SILICON, AND  
MOLYBDENUM. PRESENT OSHA EXP. LIMITS FOR HEXAVALENT-CHROMIUM IS .05  
MG/M3 AND NICKEL 1MG/M3 WHICH WILL RESULT IN SIGNIFICANT REDUCTION  
FROM 5MG/M3 GENERAL FUME LEVEL. GASEOUS REACTION IN PRODUCTS MAY

INCLUDE CARBON MONOXIDE AND CARBON DIOXIDE. OZONE AND NITROGEN OXIDES MAY BE FORMED BY THE RADIATION FROM ARC, IN ADDITION TO SHIELDING GASES LIKE ARGON AND HELIUM WHEN EMPLOYED. ONE RECOMMENDED WAY TO DETERMINE COMPOSITION AND QUANTITY OF FUMES AND GASES ARE TO TAKE AIR SAMPLE FROM INSIDE WELDER'S HELMET IF WORN OR IN BREATHING ZONE. SEE ANSI/AWS FIL-87, AVAILABLE FROM THE AMERICAN WELDING SOCIETY. SEE AWS PUBLICATION: "FUMES AND GASES IN THE WELDING ENVIRONMENT" AND AWS "EFFECTS OF WELDING ON HEALTH 1X."

**HEALTH HAZARD DATA**

ROUTES OF ENTRY .....	INHALATION, SKIN, INGESTION
HEALTH HAZARDS .....	ELECTRIC ARC-WELDING MAY CREATE: FUMES AND GASES CAN BE DANGEROUS. ARC RAYS CAN INJURE EYES AND BURN SKIN. ELECTRIC SHOCK CAN KILL.
CARCINOGENICITY .....	THE STATE OF CALIFORNIA REQUIRES THE FOLLOWING INFORMATION: WARNING: THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER
SIGNS & SYMPTOMS OF EXPOSURE .....	SEE BELOW.
MEDICAL CONDITIONS FROM EXPOSURE .....	SHORT TERM TO WELDING FUMES-DIZZINESS NAUSEA, DRYNESS & IRRITATION OF NOSE, EYES AND THROAT, CHEST TIGHTNESS, FEVER, ALLERGIC REACTION. LONG TERM-SIDEROSIS, BELIEVED TO AFFECT PULMONARY FUNCTION. NICKEL AND CHROMIUM COMPOUNDS ARE REQUIRED BY OSHA TO BE CONSIDERED CARCINOGENIC.
EMERGENCY & FIRST AID .....	REMOVE TO FRESH AIR, OBTAIN MEDICAL ATTENTION. EMPLOY FIRST AID TECHNIQUES RECOMMENDED BY AM. RED CROSS.
ADDITIONAL INFORMATION .....	NA

**SECTION 7 PRECAUTIONS FOR SAFE HANDLING AND USE**

SPILL AND LEAK PROCEDURES .....	NA
WASTE AND DISPOSAL METHOD .....	PREVENT WASTE FROM CONTAMINATING SURROUNDING ENVIRONMENT. DISCARD ANY PRODUCT RESIDUE, DISPOSABLE CONTAINER OR LINER IN ENVIRONMENTALLY ACCEPTABLE MANNER, IN FULL COMPLIANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.
HANDLING AND STORING PRECAUTIONS .....	USE EXHAUST SYSTEM. MAKE SURE INHALED AIR DOES NOT CONTAIN FUME CONSTITUENTS ABOVE PERMISSIBLE EXPOSURE LEVELS. OTHER PRECAUTIONS FOR ADDITIONAL SAFETY INFORMATION ON WELDING AND CUTTING, SEE AMERICAN STANDARD Z49.1-1983, SAFETY IN WELDING AND CUTTING, AND THE WELDING HANDBOOK, VOL. 1, CHAPTER 9, SAFE PRACTICES IN WELDING AND CUTTING, BOTH AVAILABLE FROM AM. WELDING SOCIETY INC., 550 N.W. LEJNUE RD., PO BOX 351040, MIAMI, FL 33135. PHONE 305-443-9353.
OTHER PRECAUTIONS .....	NA

**SECTION 8 CONTROL MEASURES**

RESPIRATORY MEASURES .....	USE RESPIRABLE FUME RESPIRATORY OR AIR SUPPLIED RESPIRATOR WHEN IN CONFINED SPACE OR LOCAL EXHAUST DOES NOT KEEP EXPOSURE BELOW RECOMMENDED EXPOSURE LIMIT
VENTILATION .....	USE ENOUGH LOCAL VENTILATION, AND LOCAL EXHAUST AT ARC TO KEEP FUMES AND GASES FROM WORKER'S BREATHING ZONE AND GENERAL AREA. TRAIN WORKER TO KEEP HEAD OUT OF FUMES
PROTECTIVE GLOVES .....	SEE OTHER PROTECTIVE EQUIPMENT
EYE PROTECTION .....	WEAR HELMET, FACE SHIELD WITH FILTER LENS, PROTECTIVE SCREENS, FLASH GOGGLES TO SHIELD OTHERS. START WITH SHADE TOO DARK THEN GO TO LIGHTER SHADE WHICH GIVES SUFFICIENT VIEW OF WELD ZONE.
OTHER PROTECTIVE EQUIPMENT .....	HAND, HEAD, BODY PROTECTION TO PREVENT INJURY FROM RADIATION, SPARKS AND ELECTRICAL SHOCK.
WORK/HYGIENIC PRACTICES .....	DO NOT TOUCH LIVE ELECTRICAL PARTS AND INSULATE FROM WORK AND GROUND. FOR MAXIMUM SAFETY: BE CERTIFIED FOR, AND WEAR A RESPIRATOR AT ALL TIMES WHEN WELDING OR BRAZING.

**SECTION 9 DISCLAIMER**

THIS DATA IS BELIEVED TO BE ACCURATE. HARRIS WELCO MAKES NO WARRANTY TO AND DISCLAIMS ALL LIABILITY FROM RELIANCE.

**SECTION 10 ADDITIONAL INFORMATION**

NA = NOT AVAILABLE  
 CARCINOGENICITY INFORMATION: NICKEL AND CHROMIUM COMPOUNDS ARE REQUIRED BY OSHA TO BE CONSIDERED CARCINOGENIC.