ALLEGHENY LUDLUM CORPORATION

Dedicated to Quality Specialty Steel

River Road, Brackenridge, PA 15014

HAZARDOUS MATERIAL LABEL

STAINLESS AND SPECIALITY STEELS

The following grades of steel are covered by this label:

7 Mo+, 104, 201, 201L, 201LN, 205, 216, 217M, 219, 301, 301L, 302, 304, 304L, 304N, 304LN, 305, 309, 309S, 310, 310S, 316, 316L, 316LN, 317, 317L, 317LX, 317XN, 321, 321H, 330, 332, 334, 336, 337, 339, 347, 350, 355, 348, 370, 400, 403, 404, 405, 406, 409, 410, 410S, 410HC, 418SP, 419, 420, 420HC, 425 MOD, 430, 430TI, 433, 434, 436, 437, 439, 440A, 441, 443, 444, 445, 446, 447, 448, 460, 465, 466, 467, 468, 601, 625, 629, 630, 631, 632, 718, 750, 800H, 808, 825, 839, 850, 902, 904L, 905L, 913, 916, 921, 923, 924, 940, 948, 1006, 1205, 1449, 1607, 1608, 1676, 2200, 2201, 2205, 4335, 4340, 52100, AL-44, Iron, 31 Cr Mo V, Vera 40, Idimet FP, 13-8PH, A2, A6, A8, D2, H11, H13

Steel products in their usual physical form do not pose any health hazard. However, when subjected to welding, burning, sawing, brazing, grinding, etc., potentially hazardous fumes or dust may be generated. These fumes and dusts must be controlled by engineering controls or personal protective equipment.

The product as a mixture has not been determined to be carcinogenic. However, individual components, nickel, certain chromium and cobalt compounds, and titanium dioxide in a dust or fume form when generated from the activities noted above have been associated with carcinogenicity.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: If acute overexposure to fumes occurs, remove victim from the adverse environment immediately and seek medical attention.

EYE CONTACT: Flush with large amounts of water and seek prompt medical attention.

SKIN CONTACT: Skin contactwith the product does not present a hazard. However, if dust gets on the skin, wash the contaminated area with soap and water.

INGESTION: Ingestion is not a probable source of exposure to the dusts or fumes. If particles are ingested, give 1-2 glasses of water or milk. Induce vomiting only if the victim is fully conscious and has not convulsed. Seek prompt medical attention.

PREPARED BY:	W.D. Edsall	SUPERSEDES HAZARD LABEL DATED:	12 November 1990
DATE:	1 June 1992	CONTACT:	J.R. Dierdorf 412-226-6384
REVISION:	2		

ALLEGHENY LUDLUM CORPORATION

Dedicated to Quality Specialty Steel

River Road, Brackenridge, PA 15014

MATERIAL SAFETY DATA SHEET

CHEMTREC CHEMICAL TRANSPORTATION EMERGENCY
TELEPHONE NO: 800-424-9300; DISTRICT OF COLUMBIA: 202-483-7616

EMERGENCY TELEPHONE NO. **412-226-5059**

THIS MSDS APPLIES TO THE FOLLOWING ESTABLISHED STEEL GRADES AND/OR ALLEGHENY LUDLUM TRADE NAME PRODUCTS:

CATEGORY I-B: 301, 301L, 302, 304, 304L, 304LN, 304N, 305, 316, 316L, 316LN, 317, 317L, 317LX, 317XN, 321, 321H, 347, 348, 370, 808, 850, 13-8 PH

1. HAZARDOUS INGREDIENTS

MATERIAL/CAS NO.	% BY WEIGHT RANGE	OSHA PEL	ACGIH TLV
Iron (Iron oxide form) 7439-89-6	52.3/78.0	10 mg/m³ (dust & fume)	5 mg/m³ (fume only)
Manganese* 7439-96-5	2.0 Max.	C5 mg/m³ (compound) 1 mg/m³ (fume) 3 mg/m³ (fume) (STEL)'	C5 mg/m³ (dust and compounds) 1 mg/m³ (fume) 3 mg/m³ (fume) (STEL)
Silicon 7440-21-3	4.5 Max.	10 mg/m³ (total dust) 5 mg/m³ (respirable fraction)	10 mg/m³ (total nuisance dust)
Chromium (Metal)* 7440-47-3	12.0/21.0	1 mg/m³	0.5 mg/m³
Nickel (Metal)* 7440-02-0	6.0/17.5	1 mg/m³	1 mg/m³
Molybdenum (Insoluble Compounds) 7439-98-7	5.0 Max.	10 mg/m³ (total dust) 5 mg/m³ (respirable fraction)	10 mg/m³
Titanium* (Titanium dioxide form, TiO_2) 13463-67-7	0.7 Max.	10 mg/m³ (total dust)	10 mg/m³ (total dust)
Columbium (Nb) 7440-03-1	1.0 Max.	15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)	10 mg/m³ (total dust)
Copper* 7440-50-8	0.5 Max.	0.1 mg/m³ (fume) 1 mg/m³ (dust)	0.2 mg/m³ (fume) 1 mg/m³ (dust)
Aluminum* 7429-90-5	1.5 Max.	15 mg/m³ (metal total dust) 5 mg/m³ (metal-respirable fraction)	10 mg/m³ (metal dust) 5 mg/m³ (welding fumes)
Tungsten (Wolfram) (Insoluble Compounds) 7440-33-7	1.8 Max.	5 mg/m³ 10 mg/m³ (STEL)	5 mg/m³ 10 mg/m³ (STEL)

As defined by OSHA, a STEL (Short Term Exposure Limit) is the employee's fifteen-minute, time-weighted average exposure which must not be exceeded at anytime during a workday.

* SARA Title III, Section 313, Toxic Chemical.

2. PHYSICAL DATA

BOILING POINT (760 mm Hg): N/A VAPOR PRESSURE (mm Hg) AT 20 C: N/A VAPOR DENSITY (Air = 1): N/A

APPEARANCE AND ODOR: Gray solid, odorless SPECIFIC GRAVITY (H_2O = 1): 7.6 - 7.8 MELTING POINT: 2800°F

EVAPORATION RATE (butyl acetate = 1): N/A SOLUBILITY IN WATER (% by wt. @ 20 C): N/A pH: N/A

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): N/A FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA: N/A LEL: N/A UEL: N/A

CONDITIONS OF FLAMMABILITY: Steel products do not constitute fire and explosion hazards. However, dust generated during grinding and cutting operations may present a fire and explosion hazard. Further, coatings, which are applied at the customer's request, may be combustible. For fires involving coating oils, consult the attached coating oil MSDS.

SPECIAL FIRE FIGHTING PROCEDURES: N/A UNUSUAL FIRE AND EXPLOSION HAZARDS: N/A

NATIONAL FIRE PROTECTION ASSOCIATION RATING (NFPA): Health: 2 Flammability: 0 Reactivity: 0

4. HEALTH HAZARD DATA

PRIMARY ROUTE OF EXPOSURE: Inhalation of fumes from welding or burning; dusts from grinding or cutting.

ROUTE(S) OF ENTRY: Inhalation: Yes Skin: No Ingestion: Unlikely Other: Eyes

HEALTH HAZARDS (Acute and Chronic)

Note: Steel products in their usual physical form do not pose any health hazards. However, when subjected to welding, burning, sawing, brazing, grinding, etc., potentially hazardous fumes or dust may be generated. These operations should be performed in well-ventilated areas. The primary route of exposure is from inhalation of fumes and dusts.

The effects of overexposure to the various metal fumes and dusts which may be generated from this product and the associated health effects from overexposure are as follows:

ACUTE: Excessive inhalation of metallic fumes and dusts may be irritating to respiratory passages. Excessive inhalation of fumes from many metals can produce an acute reaction known as "metal fume fever". Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), a metallic taste in the mouth, dryness and irritation of the throat. The symptoms come on a few hours after excessive exposures and usually last from 12 to 48 hours. Long term effects from metal fume fever have not been noted. Iron oxide, manganese and copper have been associated with causing metal fume fever.

High concentrations of metallic fumes and dusts can result in irritation of the eyes, skin, mucous membranes, and other forms of physical irritation.

CHRONIC: Chronic inhalation of high concentrations of metallic fumes and dusts are associated with the following conditions:

Iron Oxide: Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Manganese: Chronic exposure to high concentrations of manganese fumes and dusts may increase the incidence of pneumonia and lung damage and may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.

Nickel: Nickel fumes are respiratory irritants and may cause pneumonitis. Skin contact may cause an allergic skin rash. Nickel itch is the dermatitis resulting from sensitization to nickel; the first symptom is usually itching, which occurs up to 7 days before skin eruption occurs. The primary skin eruption is erythematous, or follicular, which may be followed by skin ulceration. Nickel sensitivity, once acquired, is apparently not lost. All airborne nickel contaminating dusts are regarded as carcinogens via inhalation.

Chromium: The health hazards associated with exposure to chromium are dependent on its oxidation state. The metal form (chromium as it exists in this product) is of very low toxicity. The hexavalent form is very toxic. Adverse effects of the hexavalent form on the skin may include ulcerations, dermatitis and allergic skin reactions. Inhalation of hexavalent chromium compounds can result in ulceration and perforation of the mucous membranes of the nasal septum, irritation of the pharynx and larynx, asthmatic bronchitis, bronchospasms and edema. Respiratory symptoms may include coughing and wheezing, shortness of breath and nasal itch. Eye irritation or inflammation may also result. The International Agency for Research on Cancer (IARC) lists hexavalent chromium compounds as a known human carcinogen. The American Conference of Governmental Industrial Hygienists (ACGIH) has reviewed the toxicity data and concluded that chromium metal is not carcinogenic to humans.

Titanium Dioxide: Titanium dioxide dust is a mild pulmonary irritant, eye and skin irritant and may be a potential carcinogen. Laboratory animals (rats) exposed to titanium dioxide developed small focal areas of emphysema which were attributable to large deposits of dust. Excessive exposure in humans may result in slight changes in the lungs. The dusts of titanium dioxide can be placed in the nuisance category.

Silicon: Elementary silicon is an inert material which appears to lack the property of causing fibrosis in lung tissue. However, slight pulmonary lesions have been reported in laboratory animals from intratracheal injections of silicon dust. Silicon dust has little adverse affect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under the TLV. Silicon may cause chronic respiratory effects.

Molybdenum: Molybdenum is not foreseen as a hazard in the present context. Though molybdenum has caused toxicity (anemia and poor growth) in farm animals, there is not data documenting toxicity to humans due to industrial exposure; however, molybdenum may cause lung disease and irritation.

Columbium (Nb): Interferes with calcium as an activator of enzyme systems.

Copper: Industrial exposure to copper fumes, dusts or mists results in metal fume fever with atrophic changes in nasal mucous membranes. Chronic poisoning results in Wilson's disease, characterized by a hepatic cirrhosis, brain damage, demyelination, renal disease and copper deposition in the cornea.

Aluminum: Excessive exposures to aluminum fumes and dust have been associated with lung disease and irritation, but this effect is probably due to the simultaneous silica exposure.

Tungsten: Chronic exposure to tungsten dust has caused respiratory disorders characterized by cough, dyspnea, and wheezing. There is no correlation between the onset of symptoms, length of exposure and the development of intitial fibrosis. Dermatitis primarily on the side of the neck, flexor parts of the forearm and the backs of the hands was also detected. Dusts of tungsten pose a hazard considered to be somewhat greater than that of nuisance dust.

CARCINOGENICITY: N/A **NTP**: No **IARC MONOGRAPHS**: No **OSHA REG.**: No

The product as a mixture has not been determined to be carcinogenic. However, individual components, nickel, certain chromium compounds, and titanium dioxide have been associated with carcinogenicity.

5. SPECIAL PROTECTION INFORMATION

VENTILATION: Local exhaust ventilation should be used to keep worker exposure below accepted exposure limits during welding and grinding operations.
RESPIRATORY PROTECTION: When engineering or administrative controls are not feasible to control overexposure during welding and grinding operations or while they are being instituted, appropriate NIOSH/MSHA approved respirators shall be used and selected according to 29 CFR 1910.134.
EYE PROTECTION: Appropriate protective eye and face equipment shall be worn where there is a reasonable probability of injury that can be prevented by such equipment (such as welding, grinding).
PROTECTIVE GLOVES: Appropriate and as needed to protect against exposure to chemical or physical hazards.

6. EMERGENCY AND FIRST AID PROCEDURES

INHALATION: If acute overexposure to fumes occurs, remove victim from the adverse environment immediately and seek medical attention.
EYE CONTACT: Flush with large amounts of water and seek prompt medical attention.
SKIN CONTACT: Skin contact with the product does not present a hazard. However, if dust gets on the skin, wash the contaminated area with soap and water.
INGESTION: Ingestion is not a probable source of exposure to the dusts or fumes. If particles are ingested, give 1-2 glasses of water or milk. Induce vomiting only if the victim is fully conscious and has not convulsed. Seek prompt medical attention.

7. REACTIVITY DATA

STABILITY: STABLE: Yes CONDITIONS TO AVOID: N/A
INCOMPATIBILITY (Materials to Avoid): Reacts with strong acids to form hydrogen gas.
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Metal fumes: iron oxide, manganese, chromium, nickel, molybdenum (insoluble form), and titanium dioxide when welding or burning.
HAZARDOUS POLYMERIZATION: Will not occur. CONDITION TO AVOID: N/A

8. PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Minimal problems with spills of this product would occur because of its solid form. However, if there is a spill of dust, clean up the spill using methods which avoid dust generation such as dry or wet vacuuming. Compressed air should not be used to clean up spills of the dust. During clean up, eye contact and inhalation of dust should be avoided as much as practical. Provide local exhaust or dilution ventilation as required. Collect material in appropriately labeled containers.
WASTE DISPOSAL METHOD: Dispose of in accordance with applicable federal, state and local regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Not applicable.
OTHER PRECAUTIONS: Not applicable.

9. ADDITIONAL COMMENTS

Metallic and non-metallic coatings may be applied to the product at the customer's request. These are usually classified as protective coatings or lubricants. The possible presence of coatings should be recognized and considered when evaluating potential employee hazards and exposures during dust/fume generating activities and potential safety and fire hazards during handling. Any applicable coating MSDS is attached to this data sheet. Any non-metallic coatings which may be applied to this product represent only a small percentage of the total weight of the product.

EPA SARA TITLE III HAZARD CATEGORIZATION: As defined by 40 CFR 370, the product is categorized as both an "immediate (acute) health hazard" and a "delayed (chronic) health hazard". Components falling under EPA SARA Title III, Section 313, are asterisked under "Hazardous ingredients", Section 1.

NOTE: The percent composition reflects the range that is possible within this GROUP of products. These are not the technical specifications for a particular product. Specific grades may not include all of the hazardous ingredients listed in Section 1. When welding or cutting products containing chromium or nickel (for example), the potential for exposure to chromium or nickel obviously increases as their percentage composition increases. Therefore, we strongly urge that all operations with potentially hazardous exposures be evaluated by a competent industrial hygienist. See sections 4 and 5 for further information.

The steel itself presents no health hazard unless it is welded, burned, ground, or cut. During these procedures, it is possible that hazardous amounts of fumes or dusts may be generated. It is advised that your particular operation be evaluated by a competent health professional to determine whether or not a hazard exists.

PREPARED BY:	W. D. Edsall	REVISION: 5	DATE:	1 June 1992
CONTACT:	J. R. Dierdorf 412-226-6384	SUPERSEDES MSDS DATED:		31 January 1991

ALLEGHENY LUDLUM CORPORATION
CROSS INDEX OF GRADES
MATERIAL SAFETY DATA SHEETS

MSDS DESIGNATION	UNS NUMBER	OTHER DESIGNATION			MSDS CATEGORY
-	-	-	-	-	-
-	-	-	-	-	-
7MO+	-	-	-	-	I-E
104	-	-	-	-	IV-B
201	S20100	-	-	-	I-A
201L	-	-	-	-	I-A
201LN	-	-	-	-	I-A
205	-	-	-	-	I-A
216	-	-	-	-	I-A
217M	-	-	-	-	IV-D
219	-	-	-	-	I-A
301	S30100	-	FCN-I	CN-I	I-B
301L	-	-	-	-	I-B
302	S30200	-	FCN-I	CN-I	I-B
304	S30400	-	FCN-I	CN-I	I-B
304L	S30403	-	FCN-I	CN-I	I-B
304N	S30451	-	FCN-I	CN-I	I-B
304LN	S30453	-	FCN-I	CN-I	I-B
305	S30500	-	FCN-II	CN-II	I-B
309	S30900	-	FCN-III	CN-III	I-D
309S	S30908	-	FCN-III	CN-III	I-D
310	S31000	-	FCN-III	CN-III	I-D
310S	S31008	-	FCN-III	CN-III	I-D
316	S31600	-	FCN-II	CN-II	I-B
316L	S31603	-	FCN-II	CN-II	I-B
316LN	S31653	-	-	-	I-B
317	S31700	-	FCN-II	CN-II	I-B
317L	S31703	-	FCN-II	CN-II	I-B
317LX	S31725	-	FCN-II	CN-II	I-B
317XN	S31726	-	FCN-II	CN-II	I-B
321	S32100	-	-	-	I-B
321H	S32109	-	-	-	I-B
330	N08330	-	-	-	III-N
332	-	-	-	-	I-D
334	-	840	-	-	I-D
336	N08366	6X	-	-	III-N
337	N08367	6XN	-	-	III-N
339	-	Alloy 20	-	-	III-N
347	S34700	-	-	-	I-B

MSDS DESIGNATION	UNS NUMBER	OTHER DESIGNATION			MSDS CATEGORY
350	S35000	AM 350	-	-	I-E
355	S35500	AM355	-	-	I-E
348	S34800	-	-	-	I-B
370	-	-	-	-	I-B
400	N04400	Monel	-	-	III-I
403	S40300	-	FCN-IV	CN-IV	II-C
404	-	-	FCN-IV	CN-IV	II-C
405	S40500	-	FCN-IV	CN-IV	II-C
406	-	-	FCN-IV	CN-IV	II-C
-	-	-	-	-	
409	S40900	-	FCN-IV	CN-IV	II-C
410	S41000	-	FCN-IV	CN-IV	II-C
410S	S41008	-	FCN-IV	CN-IV	II-C
410HC	-	-	FCN-IV	CN-IV	II-C
-	-	-	-	-	-
418SP	-	-	-	-	II-C
419	-	409HP	-	-	II-C
420	S42000	-	FCN-IV	CN-IV	II-C
420HC	-	-	FCN-IV	CN-IV	II-C
425MOD	-	-	FCN-IV	CN-IV	II-C
430	S43000	-	FCN-V	CN-V	II-D
430TI	K91800	-	FCN-V	CN-V	II-D
433	-	-	FCN-V	CN-V	II-D
434	S43400	-	FCN-V	CN-V	II-D
436	S43600	-	FCN-V	CN-V	II-D
437	-	439HP	FCN-V	CN-V	II-D
439	-	HWT	FCN-V	CN-V	II-D
440A	S44002	-	FCN-V	CN-V	II-D
441	-	18-0	FCN-V	CN-V	II-D
443	-	441 HP	FCN-V	CN-V	II-D
444	S44400	18-2	FCN-V	CN-V	II-D
445	-	Alpha IV	FCN-V	CN-V	II-D
446	S44600	-	FCN-VII	CN-VII	II-A
447	S44700	29-4	FCN-VII	CN-VII	II-A
448	S44800	29-4-2	FCN-VII	CN-VII	II-A
460	S44735	29-4C	FCN-VII	CN-VII	II-A
465	-	29-4-2C	FCN-VII	CN-VII	II-A
466	-	-	FCN-IV	CN-IV	II-C
467	-	409 Cb	FCN-IV	CN-IV	II-C
468	-	-	FCN-V	CN-V	II-D
-	-	-	-	-	-
601	-	-	-	-	III-F

MSDS DESIGNATION	UNS NUMBER	OTHER DESIGNATION			MSDS CATEGORY
625	N06625	AL-625	-	-	III-F
629	S15500	15-5	-	-	I-C
630	S17400	17-4	-	-	I-C
631	S17700	17-7	-	-	I-C
632	S15700	15-7	-	-	I-C
718	-	-	-	-	III-O
750	N07750	-	-	-	III-J
800H	N08800	-	-	-	III-N
808	-	19-9DL	-	-	I-B
825	N08825	AL-825	-	-	III-A
839	-	AL600	-	-	III-J
850	-	RA 85H	-	-	I-B
902	K93600	AL36 Invar	-	-	III-H
904L	N08904	4X	-	-	III-N
905L	K94800	4750	-	-	III-K
913	K92510	22-3	-	-	III-E
916	N14052	AL-52	-	-	III-H
921	K94100	AL-42	-	-	III-H
923	-	Moly Permalloy	-	-	III-J
924	K92801	Sealmet I	-	-	III-B
940	K94760	Sealmet IV	-	-	III-K
948	-	Sealmet 485	-	-	III-K
1006	-	-	-	-	III-L
1205	S66286	A286	-	-	I-D
1449	S44627	26-1 E Brite XM27	FCN-VII	CN-VII	II-A
1607	N06002	AL-HX	-	-	III-A
1608	N06333	RA333	-	-	III-A
1676	N10276	AL-276	-	-	III-G
2200	N02200	AL-200	-	-	III-C
2201	N02201	AL-201	-	-	III-C
2205	S31803	-	-	-	I-E
4335	K33517	-	-	-	III-L
4340	G43400	-	-	-	III-L
52100	-	-	-	-	III-L
AL-44	-	-	-	-	III-K
IRON	-	-	-	-	III-L
31Cr Mo V	-	-	-	-	III-L
Vera 40	-	-	-	-	IV-B
Udimet FP	-	-	-	-	II-A
13-8 PH	-	-	-	-	I-B
A2	-	4 Sagamore	-	-	IV-B
A6	-	32 Apache	-	-	IV-A

MSDS DESIGNATION	UNS NUMBER	OTHER DESIGNATION			MSDS CATEGORY
A8	-	-	-	-	IV-B
D2	-	3 Ontario	-	-	IV-C
H11	-	Potomac A	-	-	IV-B
H13	-	Potomac M	-	-	IV-B
SX11	-	Oriented Silicon	FCN-VI	CN-VI	V
SX12	-	Oriented Silicon	FCN-VI	CN-VI	V
SX14	-	Hi Perm	FCN-VI	CN-VI	V
SX22	-	Relay Steel	FCN-VI	CN-VI	V
SX28	-	Relay Steel	FCN-VI	CN-VI	V
SX55	-	Meter Steel	FCN-VI	CN-VI	V

PREPARED BY: W. D. Edsall
DATE: 6/1/92
CONTACT: J. R. Dierdorf 412-226-6384

Revision: 2
Superseded Index Dated: 2/2/89