Material Safety Data Sheet
Drill Rod
Precision Ground Flat Stock

January 4, 2006

STARRETT

I. Product Information – General

Sold By: The L. S. Starrett Company
121 Crescent Street
Athol, Massachusetts 01331
(978) 249-3551

Product Name: **Drill Rod** – catalogue numbers 480 (01), 481 (WI) & 482 (A2)
Precision Ground Flat Stock – No. 495 and 496(01), No. 497 and 499(A2), No. 498 (LCFM)

II. Ingredients – General information, Refer to product specification sheets for normal Chemical Analysis. (page 4)

Component	CAS NO.	OSHA PEL	ACGIH TLV
Carbon	7440-44-0	3.5 mg/m³ (as carbon black)	3.5 mg/m³ (as carbon black)
Chromium	7440-47-3	1 mg/m³	0.5 mg/m³
Cobalt	7440-48-4	0.1 mg/m³	0.02 mg/m³
Copper	7440-50-8	1mg/m³ (dust) 1mg/m³ (fume)	1 mg/m³ (dust) 0.1 mg/m³ (fume)
Iron	7439-89-6	10 mg/m³ (as iron oxide)	5 mg/m³ (as iron oxide)
Manganese	7439-96-5	5 mg/m³ (ceiling limit)	0.2 mg/m³
Molybdenum	7439-98-7	15 mg/m³ (insoluble compounds, as Mo)	10mg/m³ (insoluble compounds, as Mo)
Nickel	7440-02-0	1 mg/m³ (metal & insoluble compounds)	1.5 mg/m³ (metal)
Phosphorus	7723-14-0	0.1 mg/m³ (yellow)	0.02 ppm (yellow)
Silicon	7440-21-3	15 mg/m³ (total)	10 mg/m³
Sulfur	7704-34-9	Not available	not available
Tungsten	7440-33-7	5 mg/m³ (NIOSH) 10 mg/m³ (STEL) (NIOSH)	5 mg/m³ 10 mg/m³ (STEL) (insoluble compounds)
Vanadium	7440-62-2	0.5 mg V_2O_5/m³ (ceiling Limit) (respirable dust, as V_2O_5) 0.1 mg V_2O_2/m³ (ceiling limit) (fume, as V_2O_5)	0.05 mg/m³ (respirable dust or fume, as V_2O_5)

III. Physical Data

- Physical State – Solid
- Appearance & Odor – gray metal; odorless
- Boiling Point - >5,000 degrees F
- Melting Point – 2880 degrees F
- Specific Gravity – 7.6 to 7.8
- Vapor Pressure, Vapor Density & Evaporation Rate –NA
- Solubility – Insoluble

IV. Fire & Explosion

- Not applicable

V. Health Hazard Data

Steel products such as Drill Rod or Flat Stock in the form shipped do not present an inhalation, ingestion or contact hazard. However, when subjected to welding, burning, grinding, cutting, abrasive blasting, heat treatment, pickling, or similar operations may result in the following effects if exposures the limits listed in Section II, Ingredients.

Effects of Overexposure

Acute: Irritation of eyes, nose or throat, metallic taste in mouth, or metal fume fever. Possible dermatitis.

Chronic: Prolonged over-exposure to alloy dusts or fumes may cause skin, eye, throat or nose irritations leading to pulmonary diseases. Excessive and repeated inhalation of chromium and nickel fumes or dust may cause irritation, ulceration and increased risk of cancer in the respiratory system. Excessive and prolonged inhalation of manganese can cause central nervous system damage resembling a Parkinson like syndrome.

First Aid: Inhalation – remove to fresh air and get medical attention
Skin – wash areas well with soap and water
Eyes – flush well with running water to remove particles and get medical attention
Ingestion – in the unlikely event that large quantities of metal have been ingested, get medical attention

VI. Reactivity Data

- Stability – Stable
- Incompatibilities – avoid acids
  Avoid generation of dust which can present a moderate & explosion hazard
- Hazardous Decomposition Products – welding & burning of this product may cause the generation of a variety of noxious fumes and gasses.
- Polymerization – will not occur

VII. Personal Protection Information

- Engineering Controls (Ventilation, etc.) – ventilation should be sufficient to maintain exposure levels below the applicable exposure limits in Section II, Ingredients.
- Work Practices (Handling & Storage) – sparks from welding or burning could be a source of ignition for combustible or flammable materials
- Eye Protection – not anticipated to post a significant eye hazard
- Skin Protection – not anticipated to post a significant skin hazard
- Respiratory Protection – when engineering controls are not sufficient to lower exposure levels below the applicable exposure limits, use a NIOSH approved respirator for dusts and metal fumes within the use limits of the respirator.

VIII. Spill or Leak Procedures

- Action for Spills – N/A
- Waste or Disposal – any excess product can be recycled for further use, disposed in a permitted hazardous waste landfill, or disposed by other methods which are in accord with local, state and federal requirements.

Material Safety Data Sheet
Product Specifications
Ground Flat Stock & Drill Rod

Product Description:

Ground Flat Stock

- Flat or square bars of steel
- Generally 1/64" thick through 3" thick
- Generally 1/8" wide through 14" wide
- Generally in lengths of 18", 24" and 36"
- Precision ground to tight tolerances

Drill Rod

- Round bars of steel
- Generally 3 feet long
- Generally 1/16" diameter through 2" diameter
- Precision ground to tight tolerances

Grades Supplied

- AISI O1 – ground flat stock catalogue #496 & #495
  Drill rod catalogue #480
- AISI A2 – ground flat stock catalogue #497 & #499
  Drill rod catalogue #482
- LCFM (Low Carbon Free Machining) – ground flat stock catalogue #498
  Similar too an AISI 1117 grade of steel
- AISI W1 – drill rod catalogue #481
- AISI A6 – air hardening catalogue #344

Nominal Chemical Analysis

	O1	A2	LCFM	W1	A6
Carbon	.90	1.00	.18	.97	.70
Chromium	.50	5.25	----	----	1.00
Manganese	1.20	.60	1.35	.40	2.00
Vanadium	.20	.25	----	----	1.25
Molybdenum	----	1.00	----	----	----
Tungsten	.50	----	----	----	----
Silicon	.20	.40	.25	.17	----
Sulfur	----	----	.11	----	----
Iron	Bal.	Bal.	Bal.	Bal.	Bal.