

**M A T E R I A L S A F E T Y D A T A S H E E T**

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910. 1200 and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. Standard must be consulted for requirements.

SECTION 1 - IDENTIFICATION

Manufacturer : Drahtwarenfabrik Drahtzug Stein GmbH Co & KG
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 Germany
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Trade Name : MEGAFIL 713R, 821R, 825R
 Product Type : Flux Cored Arc Welding (FCAW) Mild Steel
 Physical Form : Flux cored wire on spools

SECTION 2 - HAZARDOUS MATERIALS

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are covered by section 5. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS COMPONENT	% WEIGHT	CAS NO.	OSHA PEL	Exposure limit (mg/m ³)
				ACGIH TLV
+IRON	75-97	7439-89-6	5 R* 10 (OXIDE FUME)	10 5 (OXIDE FUME)
# MANGANESE	<4	7439-96-5	5 CL ** (DUST) 1, 3 STEL*** (FUME)	0.2 (DUST & FUME)
TITANIUM DIOXIDE	<9	13463-67-7	5 R*	10
SILICON	<2	7440-21-3	5 R*	10
FLUORSPAR	<5	7789-75-5	2.5 (AS F)	2.5 (AS F)
# NICKEL	<1	7440-02-0	1 METAL & INSOLUBLE COMPOUNDS) 0.1 (SOLUBLE COMPOUNDS)	1 METAL & INSOLUBLE COMPOUNDS) ♦ 0.1 (SOLUBLE COMPOUNDS)
++SILICA (AMORPHOUS SILICA FUME)	<2	14808-60-7 69012-64-2	0.1 R* NOT ESTABLISHED	0.1 R 2 R*
IRON OXIDE	<2	1309-37-1	10 (AS IRON)	5 (AS IRON)
+TITANIUM	<2	7440-32-6	5 R*	10
## ALUMINUM	<2	7429-90-5	5 R* (DUST)	10 (DUST)

* RESPIRABLE FRACTION

** CEILING LIMIT

*** SHORT TERM EXPOSURE LIMIT

+ AS A NUISANCE PARTICULATE COVERED UNDER "PARTICULATE NOT OTHERWISE REGULATED" BY OSHA, OR "PARTICULATE NOT OTHERWISE" BY ACGIH.

++ CRYSTALLINE SILICA IS BOUND WITHIN THE PRODUCT AS IT EXIST IN THE PACKAGE. HOWEVER, RESEARCH INDICATES SILICA IS PRESENT IN WELDING FUME IN THE AMORPHOUS (NON-CRYSTALLINE) FORM.

♦ 1995-1996 ACGIH LISTED UNDER NOTICE OF INTENDED CHANGES AS: A1 - CONFIRMED HUMAN CARCINOGEN. LIMITS OF 0.05 MG/M³ ARE PROPOSED AND SHOULD BE CONSIDERED AS TRIAL LIMITS.

REPORTABLE MATERIAL UNDER SECTION 313 OF SARA.

REPORTABLE MATERIAL UNDER SECTION 313 OF SARA AS DUST OR FUME.

The exposure limit for welding fume has been established at 5 mg/m³ with OSHA's PEL and ACGIII's TLV. The individual complex compounds within the fume may have lower exposure limits than the general welding fume PEL/TLV. An Industrial Hygienist, the OSHA Permissible Exposure Limits For Air Contaminants (29 CFR 1910.1000), and the ACGIII Threshold limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits.



SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

Not Applicable

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables named in this document, as shipped, are non-reactive, non-flammable, non-explosive and essentially non-hazardous until welded. Welding arc and sparks can ignite combustibles and flammable products. See American National Standard Z49.1 referenced in Section 7.

SECTION 5 - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quality of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals.

Other conditions which also influence the composition and quality of the fume and gases to which workers may be exposed include: coatings on the metal being welded (such as paint plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 2. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in Section 2, plus those from the base metals and coating, etc. as noted above.

Reasonably expected constituents of the fume would include primarily iron oxides. Secondarily complex oxides of manganese, silicon and titanium and may have fluorides present. It may also contain nickel compounds and aluminum compounds and copper. Monitor for materials identified in Section 2. Fumes from the use products may contain manganese, silica fume, nickel compounds, fluorides, and copper whose exposure limits are lower than the 5 mg/m³ PEL/TLV for general welding fume.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

One recommended products way to determine the composition and quality of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. (See ANSI/AWS F1.1, available from the "American Welding Society", PO Box 351040, Miami FL 33135. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide," which gives additional advice on sampling.)

SECTION 6 - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE:

Electric arc welding may create one or more of the following health hazards:

- ARC RAYS can injure eyes and burn skin
- ELECTRIC SHOCK can kill. See Section 7.
- FUMES AND GASES can be dangerous to your health
- PRIMARILY ROUTES OF ENTRY are the respiratory system, eyes and /or skin.

SHORT-TERMS (ACUTE) OVEREXPOSURE EFFECTS:

- **WELDING FUMES** - may result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes.
- **IRON, IRON OXIDE** - None are known. Treat as nuisance dust or fume.
- **MANGANESE** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, and irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure.
- **TITANIUM DIOXIDE** - irritation of respiration system.
- **SILICA (AMORPHOUS)** - Dust and fumes may cause irritation of the respiration system, skin and eyes.
- **FLUORIDES** - Fluoride compounds evolved may cause skin and eyes burns, pulmonary edema and bronchitis.

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- **NICKEL, NICKEL COMPOUNDS** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction.
- **MAGNESIUM, MAGNESIUM OXIDE** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure.
- **BIARIUM** - Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia.
- **ALUMINUM OXIDE** - Irritation of the respiratory system.
- **CHROMIUM** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiration of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Chromium (VI) compounds may burn eyes. Allergic reaction may occur in some people.
- **COPPER** - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours overexposure.
- **MOLYBDENUM** - Irritation of the eyes, nose and throat.
- **CALCIUM OXIDE** - Dust or fumes may cause irritation of the respiratory system, skin and eyes.
- **STRONTIUM COMPOUNDS** - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea.
- **LITHIUM COMPOUNDS** - Overexposure may cause tremor and nausea.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS:

- **WELDING FUMES** - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis".
- **IRON, IRON OXIDE FUMES** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compound ceases. Iron and magnetite (Fe₃O₄) are not fibrogenic materials.
- **MANGANESE** - Long term overexposure to manganese compounds may affect the central nervous. Symptoms may be similar to Parkinson's Disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramp and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems.
- **TITANIUM DIOXIDE** - Pulmonary irritation and slight fibrosis.
- **SILICA (AMORPHOUS)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Non-crystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
- **FLUORIDES** - Serious bone erosion (Osteoporosis) and mottling of teeth.
- **NICKEL, NICKEL COMPOUNDS** - Lungs fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.
- **MAGNESIUM, MAGNESIUM OXIDE** - No adverse long term health effects have been reported in the literature.
- **BIARIUM** - Long term overexposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature.
- **ALUMINUM OXIDE** - Pulmonary fibrosis and emphysema
- **CHROMIUM** - Ulceration and perforation of nasal septum. Respiratory may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds.
- **COPPER** - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia and jaundice. High levels of copper may cause central nervous system damage characterized by nerve fiber separation and cerebral degeneration.
- **MOLYBDENUM** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia.
- **CALCIUM OXIDE** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia.
- **STRONTIUM COMPOUNDS** - strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets".
- **LITHIUM COMPOUNDS** - May be considered as potentially teratogenic.

MEDICAL CONDITONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma like conditions).

EMERGENCY AND FIRST AID PROCEDURES

Special First Aid Measures: If dizziness or respiratory problems should occur, fresh air should be breathed, in extreme case call for medical aid. Employ first aid techniques recommended by the American Red Cross.

Eyes & Skin: If irritation or flash burns develop after exposure, consult a physician.



CARCINOGENICITY

Nickel, chromium (with the exception of metallic chromium and chromium (III)) must be considered as carcinogens under OSHA (29 CFR 1910,1200). Welding fumes must be considered as possible carcinogens under OSHA (29 CFR 1910, 1200).

CALIFORNIA PROPOSITION 65: This product contains chemicals which are known to the State of California to cause cancer. Nickel, certain nickel compounds and hexavalent chromium (Cr VI) are listed under Proposition 65. Hexavalent chromium (Cr VI) may be generated during welding.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING & USE/APPLICABLE CONTROL MEANS

Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1; Safety in Welding and Cutting published by the American Welding Society, PO Box 351040, Miami FL 33135 and OSHA Publication 2206 (29 CFR 1910), US Government Printing office, Washington, DC 20402 for more detail on any of the following.

- **VENTILATION:** Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below PEL/TLV's in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.
- **RESPIRATORY PROTECTION:** Use NIOSH approved or equivalent fume or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below PEL/TLV'.
- **EYE PROTECTION:** Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade number 14. Adjust if needed by selecting the next lighter and/or darker shade number result. Provide protective screens and flash goggles, if necessary, to shield others.
- **PROTECTIVE CLOTHING:** Wear hand, head and body protection that help to prevent injury from radiation sparks and electrical shock. See ANSI Z 49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protective shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not Applicable

- **WASTE DISPOSAL:** Prevent waste from contaminating surrounding environment. Discard any product, residue, in a disposable container or environmentally acceptable manner, in full compliance with Federal, State and Local regulations.
- **IMPORTANT SPECIAL PRECAUTIONS:** Maintain exposure below the PEL/TLV. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures that exceed PEL/TLV. Always use exhaust ventilation. Refer to the following sources for important additional information: ANSI Z 49.1. The American Welding Society, PO Box 351040, Miami FL 33135 - OSHA (29 CFR 1910). U.S. Department of Labor, Washington, DC 20210.