HOBART BROTHERS

MSDS NO: TR-TW
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TW 2472

For U.S. Manufactured or Distributed Welding Consumables and Related Products. 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 specific requirements.

SECTION 1 - IDENTIFICATION

Manufacturer/Supplier Name: HOBART BROTHERS COMPANY | Telephone No: (937) 332-4000
Address: 400 TRADE SQUARE EAST, TROY, OH 45373 | Emergency No: (800) 424-9300
Products For: TUBULAR ARC WELDING ELECTRODES FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WELDING

"GROUP A": Product Type: Gas Shielded Carbon and Low Alloy Steel

Trade Name For: **EXCEL-ARC** 71; **FABCO** 80D2, 82HD, 85, 90, 825, RXR, TR70; **FABCOR** 86R, 96, 702; **FABDUAL** T9M, T91M; **FLUX-COR** 2, 3, 7, 9XT, 37, 80A1, 90D3; **GALVACOR; GALVALLOY**; **METAL-COR** 3, 3S, 6, 6L, 8, 80D2, EH14S, EL12KS, EM12KS, EN-VISION; **METALLOY** 70, 70R, 70X, 71, 76, 80D2, A1S, A3S, CO2, EH14S, EL12KS, EM12KS, EM13KS, X-CEL; **PIPEMASTER** MC70 **SPEED-ALLOY** 70, 71, 71A, 71A1, 71-V, 719, 75, 95D2, 105D2; **SPEED-COR** 6;___**SUPER-COR**; **SUPER TUF-COR**; **TM**-11, 22, 37, 55, 71 XTR, 72, 73, 75A1, 81A1, 91D3, 95D2, 105D2, 711M, 791, 811A1, RX7; **TRIPLE**-7,8; **TUF-COR** 1, 5, 75A1, 95D2, 105D2; **VERSATILE**; **VERTI-COR** I, II, III, 71, 81A1;

"GROUP B": Product Type: Self-Shielded Carbon Steel

Trade Name For: **FABSHIELD** 4, 21B, 23, 31, 55, 120C, 7027, HSR; **SELF-SHIELD** 3, 4, 7, 11, 11GS; **SPEED-SHIELD** 11, GS **TM**- 44, 77, 121, 123; 133 ___

"GROUP C": Product Type: Carbon and Low Alloy Steel

Trade Name For: **DURASHIELD** 8-11; **EDGE**; **FABCO** 81K2-C, 83, 91, 91K2-C, 110, 110K3-M, 115, 803, HICOR; **FABCOR** 209, 1100; **FABSHIELD** 3Ni1, 71K6, 81N1, 81N2, 811K6, 7018; **FLUX-COR** 80B2, 80Ni1, 80Ni2, 80W, 90B3, 90K2, 90Ni2, 100K3, 110K3; **FORMULA** XL8Ni1, XL8Ni1-C, XL525, XL550; **MEGAZORD**; **METAL-COR** 80B2, 80Ni1, 80Ni2, 80Ni3, 90, 90B3, 100, 110, B2S, B3S, F2S, MAXIM, N1S, N2S, N3S, N4S, WS; **METALLOY** 80B2, 80N1, 80N2, 80N3, 80W, 90, 90B3, 100, 100G, 110, 120S, B2S, B3S, F2S, N1S, N2S, N3S, N4S, VANTAGE, VANTAGE Ni1, WS; **PREMIER** 70; **PW**-201; **PIPEMASTER** F100-K2**,**F101-K2 F110-N1, F71, FS71-K6, FS71Ni1, FS 81-Ni2, MC90,MC100; **SELF-SHIELD** 8; **SPEED-ALLOY** 71-VC, 81B2L-V, 81Ni1-V, 81Ni2-V, 81W, 81W-V, 85, 85C1, 85C2, 85C3, 91B3, 91B3L, 91B3L-V, 91B3-V, 91-V, 92S, 95, 100F3-S, 111-V, 112-S, 115, 125, 712, 712M, 790, 4130-V; **TM**-78K6, 81B2, 81N1, 81N2, 81W, 85B2L, 85N1, 85N2, 85N3, 91B3, 91B3L, 91K2, 91N2, 95K2, 101K3, 105K3, 111K3, 115, 125K4, 770, 771, 772, 811B2, 811N1, 811N2, 811N3, 811W, 880, 881K2, 910, 911B3, 911N2, 991K2, 1101K3-C, 1101K3-M, 4130; **TUF-COR** 85B2L, 85Ni1, 85Ni2, 85Ni3, 95K2, 105K3, 115, 125K4; **VERTI-COR** 70, 72, 81B2, 81Ni1, 81Ni2, 81W, 91B3, 91K2, 91Ni2, 110K3-M, 1101K3-C, IINi1;

"GROUP D": Product Type: Corrosion Resisting Steel Metal Cored

Trade Name For: **ARC STAR** 409; **FABCOR** 409; **FABLOY** 409, 409T, 439; **FABTUF** 250, 960; **METAL-COR** 409, 409Cb, 439; **METALLOY** 18CrCb, 409, 409Cb, MCW430NbL, 439; **POWERCORE** 91; **RSC**-409; **SPEED-ALLOY** 5055; TM-B9

SECTION 2 - HAZARDOUS INGREDIENTS - IMPORTANT

This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in 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	% WEIGHT					EXPOSURE LIMIT (mg/m^3)	
INGREDIENTS	Group A	Group B	Group C	Group D	CAS NO.	OSHA PEL	ACGIH TLV
IRON+	75-98	75-95	75-95	75-95	7439-89-6	5 R*	3 R*
IRON OXIDE	---	---	<2	---	1309-37-1	10 (Oxide Fume)	5 (Oxide Fume) {A4}
#MANGANESE	<4.5	<2	<4	<2	7439-96-5	5 CL** (Dust)	0.2♦♦
						1, 3 STEL*** (Fume)	(Dust & Fume)
TITANIUM DIOXIDE	<10	<4(4)	<10	<2	13463-67-7	5 R*	10 {A4}
SILICON	<4	<2(4)	<4	<2	7440-21-3	5 R*	10
FLUORSPAR	<5(5)	1-10	<5	---	7789-75-5	2.5 (as F)	2.5 (as F) {A4}
MOLYBDENUM	<1	---	<2	<2	7439-98-7	5 R*	0.5 R*(Soluble Compounds){A3}♦
							10 I* (Elemental/Metal and Insoluble)
							3 R* (Elemental/Metal and Insoluble)
CALCIUM CARBONATE	<2	<2(7)	---	---	1317-65-3	5 R*	10
						5 (as CaO)	2 (as CaO)
##ALUMINUM	<2	<5(6)	<3(6)	---	7429-90-5	5 R* (Dust)	10 (Dust)
						5 (Fume)	5 (Fume)
MAGNESIUM+	---	<3	---	---	7439-95-4	5 R*	3 R*
MAGNESIUM OXIDE	---	<3	---	---	1309-48-4	15 R* (Oxide Fume)	10 (Oxide Fume) ♦♦♦
#BARIUM FLOURIDE	---	5-15(1)	5-15(3)	---	7787-32-8	0.5 (as Ba)	0.5 (as Ba) {A4}
#NICKEL	---	---	<4	<1	7440-02-0	1 (Metal)	1.5 (Metal) {A5}
						1 (Soluble Compounds)	0.1 (Soluble Compounds) {A4}
						1 (Insoluble Compounds)	0.2 (Insoluble Compounds) {A1}
#CHROMIUM	---	---	<3	10-20	7440-47-3	1 (Metal)	0.5 (Metal) {A4}
						0.5 (Cr II & Cr III Compounds)	0.5 (Cr III Compounds) {A4}
						0.1 CL** (Cr VI Compounds)	0.05 (Cr VI Soluble Compounds) {A1}
# COPPER	<1(2)	---	<2(2)	---	7440-50-8	1 (Dust)	1 (Dust)
						0.1 (Fume)	0.2 (Fume)
TITANIUM+	---	---	<2	<2	7440-32-6	5 R*	3 R*
SILICA++	<2	---	<2	---	14808-60-7	0.1 R*	0.1 R*
(Amorphous Silica Fume)					69012-64-2	0.8	2 R*
LITHIUM FLUORIDE	---	<2(9)	<2(9)	---	7789-24-4	2.5 (as F)	2.5 (as F) {A4}
STRONTIUM FLUORIDE	---	<2(8)	---	---	7783-48-4	2.5 (as F)	2.5 (as F) {A4}
COBALT			<1(10)		7440-48-4	0.1 (Dust&Fume)	0.02 (Dust&Fume) {A3}
CERIUM OXIDE			<2(11)		1306-38-3	15 (Dust)	10 (Dust)
						5 R* (Dust)	5 R* (Dust)

(1) Present only in FABSHIELD 21B, 23, 31, 120 C; TM 121, 123 and 78K6; SELF-SHIELD 11,11GS.
(2) Present only in FABCO 83, FLUX-COR 80W, GALVACORE; GALVALLOY; METALLOY 80 W, WS; METAL-COR 81W; SPEED-ALLOY 81W, 81W-V; TM-81W, 811W; VERTI-COR 81W
(3) Present only in FABSHIELD 3Ni1, 7018, 71K6, 81N1, 81N2, 811K6; DURASHIELD 8-11; TM 78K6; PIPEMASTER FS71-Ni1, FS81 – Ni2; SELF-SHIELD 8
(4) Present only in FABSHIELD 55; SELF SHIELD 3; TM 33, 133
(5) Present only in FABCO 85; METALLLOY EM13K5; TM 55, 75A1, 95D2, 105D2; TUF-COR 5, 75A1, 95D2, 105D2; SPEED-ALLOY 75, 75A1, 95D2, 105D2
(6) Present in All Group B Products; FABSHIELD 3Ni1, 7018, 71K6, 81N1, 81N2, 811K6; DURASHIELD 8-11; TM 78K6; PIPEMASTER FS71-Ni1, FS81-Ni2; SELF – SHIELD 8
(7) Present only in FABSHIELD 7018, 7027; SELF – SHIELD 8; TM 77, 133.
(8) Present only in FABSHIELD 21B; TM 121.
(9) Present only in FABSHIELD 3Ni1, 7018, 7027, 71K6, 81N1, 81N2, 811K6; DURASHIELD 8-11; TM 78K6; PIPEMASTER FS71-Ni1, FS81-Ni2; SELF-SHIELD 8
(10) Present only in DURASHIELD 8-11; FABSHIELD 71K6 81N1, 81N2; MEGAZORD; PIPEMASTER F110-N1, FS71-Ni1, FS81-Ni2
(11) Present only in Durashield 8-11; Fabshield 7018; SELF – SHIELD 8
R* - Respirable Fraction. I* - Inhalable Fraction. ** - Ceiling Limit *** - Short Term Exposure Limit.
{A1} - Confirmed Human Carcinogen per ACGIH. {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH.
{A4} - Not Classifiable as a Human Carcinogen per ACGIH. {A5} - Not Suspected as a Human Carcinogen per ACGIH.
+ - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH.
++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form. ♦ - 2002 ACGIH listed under Notice of Intended Changes. A2 - "Suspected Human Carcinogen ".
♦♦ - 2002 ACGIH listed under Notice of Intended Changes. Limits of 0.03 mg/m3 (respirable fraction) are proposed and should be considered as trial limits.♦♦♦- 2002 ACGIH listed under Notice of Intended Changes. Limits of 10 mg/m3 (inhalable fraction) that will be classified as A4 – "Not Classifiable as a Human Carcinogen per ACGIH" 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/m^3 with OSHA's PEL and ACGIH'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 ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits.

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

Welding consumables applicable to this sheet are solid and nonvolatile as shipped.

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs 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 quantity 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 quantity of the fumes 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 metal and coating, etc., as noted above.

Reasonably expected constituents of the fume would include: Complex oxides of iron, manganese, silicon and titanium. Groups A and B may also contain calcium oxides. Groups A, B and C may have fluorides present. Groups A, C, and D may also contain molybdenum. Group B may also contain magnesium. Groups A, B, and C may also contain aluminum. Groups B and C may also contain barium. Groups A and C may also contain copper. Groups C and D may also contain chromium and nickel. Group B may also contain magnesium, lithium and strontium.

Monitor for the materials identified in Section 2. Fumes from the use of this product may contain barium, fluorides, manganese, calcium oxide, chromium and nickel compounds, copper, and amorphous silica fume whose exposure limits are lower than the 5 mg/m^3 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 way to determine the composition and quantity 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", P.O. 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.

PRIMARY ROUTES OF ENTRY are the respiratory system, eyes and/or skin.

SHORT-TERM (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, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure.

TITANIUM DIOXIDE - Irritation of respiratory system.

SILICA (AMORPHOUS) - Dust and fumes may cause irritation of the respiratory system, skin and eyes.

FLUORIDES - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis.

MOLYBDENUM, CERIUM OXIDE - Irritation of the eyes, nose and throat.

CALCIUM OXIDE - Dust or fumes may cause irritation of the respiratory system, skin and eyes.

ALUMINUM OXIDE - Irritation of the respiratory system.

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.

BARIUM - Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia.

NICKEL, NICKEL COMPOUNDS - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction.

CHROMIUM - Inhalation of fume with chromium (VI) compounds can cause irritation 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. Eyes may be burned by chromium (VI) compounds. Allergic reactions 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 following overexposure.

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.

COBALT – Pulmonary irritation, cough, dermatitis, weight loss.

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 compounds ceases. Iron and magnetite (Fe_3O_4) are not regarded as fibrogenic materials.

MANGANESE - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's Disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps 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. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.

FLUORIDES - Serious bone erosion (Osteoporosis) and mottling of teeth.

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.

ALUMINUM OXIDE - Pulmonary fibrosis and emphysema.

MAGNESIUM, MAGNESIUM OXIDE - No adverse long term health effects have been reported in the literature.

BARIUM - Long term overexposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature.

NICKEL, NICKEL COMPOUNDS - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.

CHROMIUM - Ulceration and perforation of nasal septum. Respiratory irritation 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.

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.

COBALT – Repeated overexposure to cobalt compounds can produce reduced pulmonary function, diffuse nodular fibrosis of lungs and respiratory hypersensitivity. IARC considers cobalt compounds as possibly carcinogenic to humans (GROUP 2B).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Persons with pre-existing impaired lung functions (asthma-like conditions).

EMERGENCY AND FIRST AID PROCEDURES:

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:

Chromium VI and nickel compounds must be considered as carcinogens under OSHA (29 CFR 1910.1200). Chromium VI compounds are classified as IARC Group 1 and NTP Group 1 carcinogens. Nickel compounds are classified as IARC Group 1 and NTP Group 2 carcinogens.

Welding fumes must be considered as possible carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65:

For Group C and D products: WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.)

For Group A and B products: WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

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

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S. 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/TLVs 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 respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below PEL/TLVs.

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. Provide protective screens and flash goggles, if necessary, to shield others.

PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark nonsynthetic 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, disposable container or liner in an environmentally acceptable manner, in full compliance with Federal, State and Local regulations.

SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLVs. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLVs. Always use exhaust ventilation. Refer to the following sources for important additional information: ANSI Z49.1 from the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA (29 CFR 1910) from the U.S. Department of Labor, Washington, DC 20210.

Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.