Material Safety Data Sheet complies with ANSI Z400: 1,ISO 110140, OSHA 29 CFR 1910.1200,EECG 91/155/ECC&GHS

1. Product and Company Description

Product Name : **Cromoten 9 M**
Application : Arc Welding
Type of Product : SMAW Electrode
AWS Classification : AWS A/SFA 5.5 E 9018-B9
Supplier : ADOR WELDING LIMITED, Corporate Marketing Office
5/A, "CORPORA" L.B.S. Marg, Bhandup (W), Mumbai – 400 078
Telephone No. : (022)66239300/35, 25962564/69/77
Fax No. : (022)25966562/606
Email : cmo@adorians.com
Web site : www.adorwelding.com

2. Hazards Identification

Emergency Overview

These hazards are related to welding fumes and not to the electrode as solid. When these products are used in a welding process the most important hazards are heat, radiation (Infra red & Ultraviolet), electric shock and welding fumes and gases.

WARNING!

Electric shock can kill.
Arc rays can severely damage eyes and/or skin.
Avoid eye contact or inhalation of dust from these products.
Skin contact is normally not hazardous but should be avoided to prevent possible allergic reactions.
Spatter and melting metal can cause burn injuries and start fire.
Avoid fume exposure. Fumes contain material that can cause cancer. Risk of cancer depends on duration and level of exposure as well as fume contents, which include various metals and metal oxide.

Route of Entry: Inhalation

Health Hazards:

Hazard Statement:

Acute Toxicity :Category 5
Eye Effect: Category 2
Skin Corrosion/irritation: Category3
Sensitization; Respiratory &Skin: Category 1
Carcinogenicity: Category 1 by IARC evaluation 2B & NTP
Target Organ Systemic Toxicity: Single Exposure Category 3
Repeated Exposure: Category 2
Aspiration Toxicity: Category 2

Environment Hazards:

Acute & Chronic Aquatic Toxicity: Not Known
Chronic Aquatic Toxicity: Bioaccumulation Potential - Not Known

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3. Chemical Composition

The product is a solid mass having grayish color. This product is made up with core wire covered by flux, which contains Rutile as bulk constituent

Chemical Composition

INGREDIENTS	CAS No.	EINECS	OSHA LIST (1)	Hazard Classification (2)	IARC (3)	NTP (4)
Aluminum Oxide	1344-28-1	215-691-6	-	No	-	-
Calcium Carbonate	1317-65-3	215-279-6	-	No	-	-
Iron	7439-89-6	231-096-4	-	No	-	-
Manganese	7439-96-5	231-105-1	-	No	-	-
Silicate Binder	1344-09-8 1312-76-1	215-687-8 215-199-1	-	No	-	-
Silicon dioxide	14808-60-7	238-878-4	-	T; R45	1	K
Titanium Dioxide	13463-67-7	236-675-5	-	No	2B	-
Chromium	7440-47-3	231-157-5	-	No	-	-
Calcium Fluoride	7789-75-5	232-188-7	-	No	-	-
Nickel	7440-02-0	231-111-4	--	Carc. Cat. 3; R40-R43	2B	R
Molybdenum	7439-98-7	231-107-2	-	No	-	-
Silicon	7440-21-3	231-130-8	-	No	-	-
Vanadium	7440-62-2	231-171-1	-	No	-	-
Niobium	7440-03--01	231-113-5	-	N0	-	-

(1) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).
(2) Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.
(3) Evaluation according to the International Agency for Research on Cancer.
1 – Human Carcinogen 2B – Possibly carcinogenic to humans
(4) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
K – Known Carcinogen S – Suspect Carcinogen

Approximate Composition (wt %)

Composition	Iron	CaCO3	CaF2	Cr	K	SiO2	Iron Powder	TiO2	Mo	Mn	CrCO2	Na	Si	Ni	V	Al2O3	Li	Cb
%	70.81	8.1	6.345	4.86	2.4	1.35	1.35	1.08	0.54	0.54	0.54	0.45	0.405	0.405	0.27	0.27	0.15	0.135

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS:

Welding Fumes - May result in discomfort such as dizziness, nausea, dryness and/or irritation of nose, throat and/or eyes. **Iron & Iron Oxide** - None are known. Treat as nuisance**. Manganese** - Metal fume fever characterized by chills, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure**. Aluminum Oxide** - Irritation of the respiratory system. **Calcium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes**. Silica (Amorphous**) - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Titanium Dioxide** - Irritation of respiratory system. Fluorides- Fluoride compounds may cause skin and eye burns, pulmonary edema and bronchitis. **Chromium & Chromium Compounds** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Allergic reactions may occur. **Nickel & Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reactions, skin sensitizer and suspected carcinogen. **Molybdenum** - Irritation of eyes, nose and throat. **Magnesium & Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest. Symptoms may last 24 to 48 hours following overexposure. **Silicate Binders & Silica Amorphous** - Dust and fumes may cause irritation of the respiratory system, skin and eyes.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS:
Welding Fumes - Excess level 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 neurological problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait**. Aluminum Oxide** - Pulmonary fibrosis and emphysema**. Calcium Oxide** – Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **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 cancer. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of exposure to chromium (III) and (VI) compounds to employee. **Nickel & Nickel Compounds** - Lung fibrosis or pneumoconiosis. **Magnesium & Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Silicate Binders** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis.

4. First Aid Measures

Inhalation Nasal irritation, headache ,dizziness, nausea, vomiting, heart palpitations, breathing difficulty, tremors, red flushing of face, irritability. Remove the exposed person from source of exposure to fresh air. If breathing has stopped, perform artificial respiration and obtain medical assistance immediate if breathing is difficult, provide fresh air and call physician.

Eye contact For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, call for medical assistance.

Skin contact For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. Wash with mild soap and water to remove dust or particles.

Electric shock Disconnect and turn off the power. Use a nonconductive material to pull victim away from Contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.

Ingestion If swallowed, do NOT induce vomiting. Seek immediate medical attention**.**

General Move to fresh air and call for medical aid

5. Fire Fighting Measures

Suitable Extinguishing Media: No specific recommendations for welding consumables. Foam, extinguishing powder, carbon dioxide, and water fog. Welding arcs and sparks can ignite combustible and flammable materials.
Use the extinguishing media recommended for the burning materials and fire situation.

Special protective equipment and precaution for fire fighters: Wear NIOSH approved self-contained breathing apparatus with full face mask as fumes or vapors may be harmful. Do not inhale combustion gases.
Combustion Products: Irritating toxic substances may be emitted upon thermal decomposition. Thermal decomposition products may include oxides of carbon and nitrogen.

6. Accidental Release Measures

Personal precautions: Depending on extent of release, consider the need for fire fighters emergency responders with adequate personal protective equipment for clean up.
Do not eat, drink, or smoke while cleaning up. Avoid all sources of ignitions, hot surfaces and open flames.

Environmental precautions:
Prevent spills from entering storm sewers or drains and contact with soil.

7. Handling and Storage

Precautions for Handling:
Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Avoid contact with eyes and skin. Do not ingest.
Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.
Use in well ventilated areas away from all ignition sources.

Storage:
Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions

8. Exposure Controls / Personal Protection

Engineering measures:
Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases away from breathing zone and general area. Keep working place and protective clothing clean and dry. Train the welders to avoid contact with live electrical parts. Insulate conductive parts. Keep the head out of the fumes. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment:

Eye protection: Wear helmet or use face shield with filter lens. Provide protective screens and flash goggles, if necessary, to shield others.

Respiratory Protection:
Use NOISH APPROVED respirator or air-supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Take special care while welding painted or coated steels since hazardous substances from the coating may be emitted.

Protective Clothing for skin Protection: Wear hand, head, eyes, ear and body protection like welder's gloves, and helmet or face shield with filter lens, safety boots, apron, and arm and shoulder protection. Keep protective clothing clean and dry. Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits.

The following limits can be used as guidance.

For information about welding fume analysis refer to Section 10

Material Safety Data Sheet complies with ANSI Z400: 1,ISO 110140, OSHA 29 CFR 1910.1200,EECG 91/155/ECC&GHS

Exposure Limits

INGREDIENT	CAS No.	ACGIH TLV (1) (mg/m3)	OSHA – PEL(2) (mg / m3)
Welding Fumes	-	5	-
Aluminum Oxide	1344-28-1	1**	15*, 5**
Calcium Carbonate	1317-65-3	10	10
Iron	7439-89-6	5 (Oxide Fume)	10 (Oxide Fume)
Manganese	7439-96-5	0.2 (Fume)	5
Silicate Binder	1344-09-8 1312-76-1	10	10
Silicon dioxide	14808-60-7	0.025**	10mg/m*** / %SiO2+2
Titanium Dioxide	13463-67-7	10	15*
Chromium	7440-47-3	0.5(Metal), 0.5 (Cr III compounds), 0.05(Cr VI Soluble Compounds), 0.01(Cr VI insoluble compounds)	1(metal) ,0.5(Cr II & Cr III compounds),0.005(Cr VI compounds)
Calcium Fluoride	7789-75-5	5	2.5
Nickel	7440-02-0	1.5* (elemental),0.1*(soluble compound),0.2*(insoluble compounds)	1(metal),1(soluble compounds),1(insoluble compounds)
Molybdenum	7439-98-7	0.1*	15
Silicon	7440-21-3	10*,3***	15*,5**
Vanadium	7440-62-2	None	None
Niobium	7440-03--01	None	None

1) Threshold Limit Values according to American Conference of Governmental Hygienists, 2007
(2) Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)
Unless noted, all values are for 8 hour time weighted averages (TWA).
*Total dust, ** Repairable fraction.

9. Physical and Chemical Properties

Appearance: Solid, non-volatile with varying color
Melting point: >1300℃ / >2300ºF

Physical Appearance:	Solid, coated electrode
Odor:	Odorless
pH:	Not applicable
Specific Gravity:	Less than 1
Water Solubility:	Insoluble in water.
Boiling point:	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Percent Volatiles by Volume:	Not detected
Viscosity:	Not applicable

10. Stability and Reactivity

Stability: These products are stable under normal conditions.
Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.
When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from manual metal arc welding varies with welding parameters and dimensions but is generally no more than 3 to 13 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Cr, Si, K, Ca, Al, Mo, Cu, and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries. Manganese and nickel also have low exposure limits, in some countries that may be easily exceeded.

Air around the welding area can be affected by the welding process parameters and expected to have gaseous products which include carbon oxides, nitrogen oxides and ozone as well as the particulate matter arising from electrode and material to be welded.

Chemical Stability: Stable under ordinary conditions of use and storage.
Conditions to Avoid: Heat, flames, ignition sources
Materials / Chemicals to Be Avoided: Strong Acids & Bases

11. Toxicological Information

Chronic toxicity: Inhalation of welding fumes and gases can be dangerous to your health.
Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form, which is not considered to be a carcinogen.
Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.
Target Organ Effects: May cause damage to nervous system, other gastrointestinal track, respiratory track and liver, skin, eyes & blood.

12. Ecological Information

Welding consumables and materials can degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

13. Disposal Considerations

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.
USA RCRA: Unused products or product residue containing chromium is considered hazardous waste if discarded, RCRA ID characteristic Toxic Hazardous Waste D007.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater.
Welding slag from these products typically contain mainly the following components originating from the coating of the electrode: Fe, O, Mn, Cr, Ni, F, Na, Si, K, Ca, Al, Mg, Mo, Cu, and Ti

14. Transportation Information

No international regulations or restrictions are applicable

15. Regulatory Information

Read and understand the manufacturer's instructions carefully for your employer. Follow the health precautions and safety instructions are given on the label. Observe any federal and local regulations. Take precautions while welding and protect yourself and others.

WARNING! Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

Canada : WHMIS classification: Class D; Division 2, Subdivision A
Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA : Under the OSHA Hazard Communication Standard, these products are considered hazardous. These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)
United States EPA Toxic Substance Control Act: All constituents of these products are on the SCA inventory list or are excluded from listing.

CHEMICAL INVENTORY LISTINGS:

AUSTRALIA	Yes (AUS)
CANADA	Yes (DSL)
CHINA	Yes (ECSC)
EUROPEAN UNION	Yes (EINECS/ELINCS)
JAPAN	Yes (ENCS)
KOREA	Yes (ECL)
PHILIPPINES	Yes (PICCS)
UNITED STATES	Yes (TSCA)

CERCLA/SARA Title III

SARA 301/302/303

No chemicals in this product are listed as extremely hazardous substances in 40 CFR 355 Emergency Planning And Notification (Appendix A to Part 355)

SARA 304

No chemicals in this product require reporting under the requirement of 40 CRF 355 Emergency Planning And Notification (SARA extremely hazardous substances listed in Appendix A to Part 355 or CERCLA hazardous substances listed in Table 302.4 of 40 CFR Part 302).

EPCRA/SARA Title III 313 Toxic Chemicals

This product contains following chemicals in excess of the applicable de minimis concentrations that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 (Table 372.65)

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Ingredient name Disclosure threshold

Chromium	1.0%	de minimis concentration
Copper	1.0%	de minimis concentration
Manganese	1.0%	de minimis concentration
Nickel	0.1%	de minimis concentration

LIST FOR TOXIC CHEMICALS ; TABLE II
Aluminum Oxide, Aluminum Dust or fume, Nickel, Manganese, Copper, Chromium

According to EC Directive 88/379/EEC, these products are classified with the following risk and safety phrases due to their content of nickel:

Symbols :
Harmful :

R-phrases : **R40 –** Limited evidence of a carcinogenic effect.
R43 – May cause sensitization by skin contact.
S-phrases : **S2 –** Keep out of the reach of children.
S22 – Do not breathe dust.
S36 – Wear suitable protective clothing.

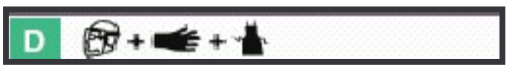
16. Other Information

Hazardous Material Information System (U.S.A.)

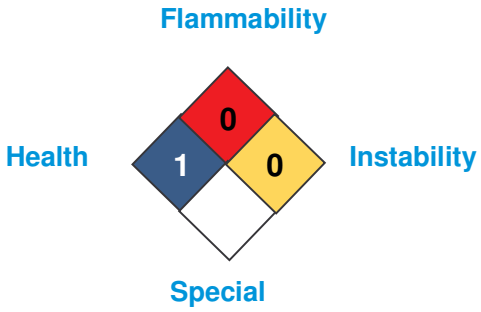
HEALTH	*	2
FLAMMABILITY		0
PHYSICAL HAZARD		0
Personal Protection		

HIMS Ratings:
Health: 0
Flammability: 0
Physical Hazard: 0

0 = Minimal Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard



National Fire Protection Association (U.S.A.)



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USA : American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135.

Safety and Health Fact Sheets available from AWS at www.aws.org. OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK : WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR

R-phrases:
R25 – Toxic if swallowed.
R32 – Contact with acids liberates very toxic gas.
R40 – Limited evidence of a carcinogenic effect.
R43 – May cause sensitization by skin contact.
R45 – May cause cancer.
R36/38 – Irritating to eyes and skin.

Ador Welding Limited requests the users of these products, to study this Safety Data Sheet (SDS) and be aware of product hazards and risk information. To promote safe use of these products, a user should:

- Notify its employees, agents and contractors about product hazards/safety information.
- Furnish this same information to each of its customers for these products.

The information herein, is given in good faith and based on technical data that generated by ADOR Welding Ltd., believes to be reliable. Since sometimes the working conditions at use of these products are out of our control, we assume no liability in connection with any such use. No warranty, expressed or implied is given.

Key Legend Information:
N/A – Not Applicable
ND – Not Determined
ACGIH – American Conference of Governmental Industrial Hygienists
OSHA – Occupational Safety and Health Administration
TLV – Threshold Limit Value
PEL – Permissible Exposure Limit
TWA – Time Weighted Average
STEL – Short Term Exposure Limit
NTP – National Toxicology Program
IARC – International Agency for Research on Cancer