

MATERIAL SAFETY DATA SHEET

1. MATERIAL IDENTIFICATION

Manufacturer name : NLMK-Clabecq SA
Address : 101 rue de Clabecq
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Product Name : Carbon Alloy Steel
Chemical family : Metals
Form : Hot rolled sheet or plates and Semi-finished products (slabs)

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2. HAZARDOUS INGREDIENTS

<u>Material or component CAS number & Weight</u>			<u>Exposure limits</u>	
			<u>OSHA PEL (mg/m3) ACGIH TLV (mg/m3)</u>	
<u>Alloy Elements</u>				
Carbon (C)	7440-44-0	0.00-1.5	None Listed	None Listed
Chromium (Cr)	7440-47-3	0.00-30	1.0 as chrome	0.5 as chrome salts
Copper (Cu)	7440-50-3	0.00-0.7	0.2 as copper : 1.0 dust	0.2 as fume : 1.0 dust
Lead (Pb)	7439-92-1	0.00-0.35	0.05 as fume & dust	0.15 as dust & fume
Manganese (Mn)	7439-96-5	0.05-2.0	5 as manganese	5 as dust, 1 fume
Molybdenum (Mo)	7439-98-7	0.00-10	15 as insoluble compds	10 as insoluble compd
Nickel (Ni)	7440-02-0	0.00-37	1.0 as Nickel	1.0 as Nickel
Phosphorous (P)	7723-14-0	0.15 Max.	0.1 as Phosphorous	0.1 as Phosphorous
Silicon (Si)	7440-21-3	0.00--3	None Listed	10 total dust
Sulphur (S)	7704-34-9	0.000-0.35	13 Sulphur dioxide	5 Sulphur dioxide
Tungsten (W)	7740-33-7	0.00-20	None Listed	5 insoluble compds
Vanadium (V)	7440-62-2	0.00-5.0	0.5 dust : 0.1 fume	0.05 dust & fume
Aluminium (Al)	7429-90-5	0.00-0.5	Not Available	5 as welding fume
Tellurium (Te)	12394-80-9	0.00-0.07	0.1 as Tellurium compds	0.1 as Tellurium compds
Boron (B)	7740-42-8	0.00-0.01	15 as Boron Oxyde	10 as Boron Oxyde
Iron (Fe)	7439-89-5	100 Max	10 iron fume :N/A as Fe	N/A as iron : 5 as Fe
Zirconium (Zr)	7440-67-2	0.0-0.05	5 as Zr	5 as Zr
Titanium (Ti)	7440-32-6	0.00-0.200	15	10 as Total dust
Cobalt (Co)	7440-48-4	0.00-0.010	0.1 as metal, dust, fume	0.1 as metal, dust, Fumes
Niobium (Nb)	7440-03-1	0.00-0.20	N/A	N/A
Selenium (Se)	7782-49-2	0.00-0.07	0.2	0.2
Nitrogen	10102-44-0	000-2.00	6.0 as NO2	6.0 as NO2
Antimony (Sb)	1309-64-4	0.00-1.00	0.5	0.5

Note : The above listing is a summary of the elements used in alloying steel. Various grades of steel will contain different combinations of these elements. For example, Lead is not alloyed in Duferco steel products and is usually below detection limit. Trace elements may also be present in minute amounts.

3. PHYSICAL DATA

Melting Point	Base Metal 2750°F	
	Vapor Pressure (MM HG at 20°C)	Not Applicable
	Specific Gravity : (Water = 1)	Greater than 7
	Vapor Density (Air = 1°)	Not Applicable
	Evaporation Rate	Not Applicable
	Boiling Point	Not Applicable
	Solubility in Water	Not Applicable
	Appearance and Odour:	Grey, Silvery, Odourless Black with metallic lustre

4. FIRST AID

INHALATION of airborne fumes and particulates, remove to fresh air. Get medical attention.

EYE CONTACT: Immediately flush well with running water. Get medical attention.

SKIN CONTACT: If irritation develops, remove clothing and wash well with soap and water. If condition persists, get medical attention.

5. REACTIVITY DATA

- STABILITY:** Stable except at extreme heat (above 2750°F).
- INCOMPATIBILITY:** React with strong acids to form hydrogen gas.
- HAZARDOUS DECOMPOSITION PRODUCTS:** Smoke fumes and oxide of iron, manganese, chromium, nickel and molybdenum when welding or flame cutting. Area to be kept well ventilated.

6. SPILL OR LEAK PROCEDURES:

Not applicable to steel in the solid state.

7. SPECIAL PROTECTION INFORMATION:

RESPIRATORY: NIOSH-approved respirators should be used to avoid excessive inhalation of fumes and particulates. Ventilation should be provided during welding, burning, grinding and other machining operations.

EYE: Safety glasses should be used when sawing, burning, welding, grinding and other machining operations.

OTHER CLOTHING & EQUIPMENT: Additional clothing and protective equipment may be needed depending on the operations.

8. SPECIAL PRECAUTIONS:

Good housekeeping practices should be maintained at all times in the work area.

Safety and working equipment should be maintained in good condition.

Steel may be protected with various coating, oils or painted. In such cases, and depending on the nature of the material, special precautions should be taken when handling, cutting, welding, burning and any other operations that may result in the formation of fume or dust.

9. FIRE AND EXPLOSION DATA

Steel products in the solid state do not present a fire or explosion hazard.

10. HEALTH/SAFETY INFORMATION

Steel products in the natural state do not present an inhalation, ingestion, or contact health hazard. However, operations such as welding, burning, sawing, brazing, grinding, and possibly machining, which results in elevating the temperature of the product to or above its melting point or results in the generation of airborne particulates may present hazards. The above operations should be performed in well ventilated areas. The major exposure hazard is inhalation.

Effects of overexposure are as follows:

ACUTE: Excessive inhalation of metallic fumes and dusts may result in irritation of eyes, nose, and throat. Also high concentrations of fumes and dusts of iron-oxide, manganese, copper, zinc & lead may result in metal fume fever. Typical symptoms consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever, and usually last from 12 to 48 hours.

CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the condition listed opposite to the element:

<i>Aluminium</i>	– <i>May initiate fibrotic changes to lung tissue.</i>
<i>Chromium</i>	– <i>Various forms of dermatitis, inflammation and/or ulceration of upper respiratory tract, and possible cancer of nasal passages and lungs.</i>
<i>Copper</i>	– <i>Pulmonary effects.</i>
<i>Iron (Iron-oxide)</i>	– <i>Pulmonary effects, siderosis.</i>
<i>Lead</i>	– <i>Prolonged exposures can cause behavioural changes, kidney damage, periphery neuropathy characterised by decreased hand-grip strength and adverse reproductive effects.</i>

<i>Manganese</i>	– <i>Bronchitis, pneumonitis, lack of coordination.</i>
<i>Molybdenum</i>	– <i>Pain in Joints, hands, knees and feet. Morphological changes in the liver, kidneys and spleen; anemia, diarrhea, coma, deformity and growth retardation.</i>
<i>Nickel</i>	– <i>Same as Chromium.</i>
<i>Phosphorous</i>	– <i>Necrosis of the mandible.</i>
<i>Sulphur (as sulphur dioxide)</i>	– <i>Edema of the lungs.</i>
<i>Tellurium</i>	– <i>Garlic odour of breath and perspiration, metallic taste in mouth, dryness of the mouth, inhibition of sweet function, anorexia, nausea.</i>
<i>Tungsten</i>	– <i>Some evidence of pulmonary involvement such as cough.</i>
<i>Vanadium</i>	– <i>Emphysema, pneumonia.</i>
<i>Zinc</i>	– <i>Arthritis, lameness and inflammation of the gastro-intestinal tract reported from animal studies.</i>