

# NOVAMET

## Novamet<sup>®</sup> Stainless Steel Flake

This includes the following grades:

Fine Leafing  
Standard Leafing  
Fine Water  
Standard Water

### Hazardous Ingredients

Hazardous Ingredients	Calculated Composition	C.A.S. No	PEL <sup>1</sup> –mg/m <sup>3</sup>	TLV <sup>2</sup> –mg/m <sup>3</sup>
Nickel (Ni)*	12	7440-02-0	1	1.5*
Chromium (Cr)	17	7440-47-3	1	0.5

\* As inhalable fraction

### Physical and Chemical Data

Fine, bright, odourless metallic flake.

Ingredient	Mol. Wt.	Specific Gravity	m.p. °C	b.p. °C	Sol. In H <sub>2</sub> O g/100ml
Ni	58.71	8.9	1453	2732	0
Cr	52.00	7.2	1890	2482	0

### Physical Hazards

Metal flake heat treated in reducing atmospheres may become spontaneously combustible.

### Health Hazards

Acute toxicity:

Ingredient	Formula	Oral LD <sub>50</sub> rat (mg/kg) <sup>(6)</sup>	Inhalation LC rat (mg / ¼ h)	Dermal LD <sub>50</sub> rat (mg/kg)
Nickel Metal	Ni	>9000	Unknown	Unknown

#### **Nickel**

LD<sub>50</sub> ORAL RAT >9000 mg/kg

Inhalation:

The National Toxicology Program has listed nickel as reasonably anticipated to be a carcinogen based on the production of injection site tumors. The International Agency for Research on Cancer (IARC) found there was inadequate evidence that metallic nickel is carcinogenic to humans but since there was sufficient evidence that it is carcinogenic to animals, IARC concluded that metallic nickel is possibly carcinogenic to humans. In 1997, the ACGIH categorized elemental nickel as: A5 "Not Suspected as a Human Carcinogen". Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard.

Evidence for the association of nickel compound exposures and cancer risk comes mainly from workers in now obsolete nickel refining operations where very high

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concentrations of airborne nickel, mostly present as oxidic or sub-sulphidic species at up to 100mg/m<sup>3</sup> or more, were associated with excess nasal and lung cancers.

The inhalation of nickel powder has not resulted in an increased incidence of malignant lung tumors in rodents. Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats. Repeated intratracheal instillation of nickel powder did not produce an increased incidence of malignant lung tumors in hamsters when administered at the maximum tolerated dose. Single intratracheal instillations of nickel powder in hamsters at doses near the LD50 produced an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas.

Inhalation of nickel powder at concentrations 15 times the TLV irritated the respiratory tract in rodents.

Inhalation of nickel may induce asthma. This effect is rare, it has been reported in welders where exposures to nickel are often mixed with other chemical substances. Persons with a known history of nickel sensitive asthma should avoid such contact.

**Skin Contact:** Prolonged and intimate contact with metallic nickel may cause irritation to the skin and nickel sensitivity, which may result in allergic skin rashes.

One case has been reported of asthma induced by external exposure to a nickel-containing skin clip and by skin contact with nickel.

**Wounds:** Nickel metal powder has caused tumors at the site of injection in rodents. However, studies do not suggest a significant risk for humans from nickel-containing prostheses.

**Ingestion:** The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded there is no evidence that nickel and its inorganic compounds are carcinogenic when ingested. The U.S. Food and Drug Administration has affirmed that nickel is generally recognized as safe (GRAS) as a direct human food ingredient.

**Preexisting Conditions:** Prolonged and intimate skin contact can cause an allergic skin rash in previously sensitized individuals.

**Reproductive Toxicity:** Animal experiments indicate that soluble nickel ingestion causes adverse effects on fetal development at a threshold oral exposure of 2.2 mg/ Ni/kg/day by pregnant rats. Data are insufficient to determine if this effect occurs in humans and no regulatory agency has classified soluble forms of nickel as reproductive risks for humans.

The Stainless Steel Flake is made of 316 grade stainless steel. Since we are unaware of any toxicological tests of 316 stainless steel, we have written this MSDS as though this product were a mixture of metallic chromium and nickel. This is probably a very conservative assumption as indicated by the results of some cancer bioassays conducted on nickel-containing alloys. The routes of administration used in these studies are irrelevant to human exposure but within a given route and animal species, the results may indicate the relative carcinogenic potency of the different alloys. The results suggest that the alloys containing 40% or less nickel are not carcinogenic even by parenteral routes of administration. The results are shown in the table at the end of this MSDS.

### Chromium

**Inhalation:** The National Toxicology Program (NTP) concluded there is inadequate evidence for the carcinogenicity of chromium metal in humans. NTP states there is sufficient evidence for increased incidence of lung cancer among workers in the chromate-producing industry and possibly also among chromium platers and chromium alloy workers. The International Agency

for Research on Cancer (IARC) has concluded that chromium metal is not classifiable as to its carcinogenicity to humans.

### **Precautions for safe storage, handling and use**

Do not inhale flake. Keep container closed when not in use. Ventilation is normally required when handling or using this product to keep exposure to airborne contaminants below the exposure limits. If ventilation alone cannot so control exposure, use NIOSH-approved respirators selected according to OSHA 29 CFR 1910.134. Maintain airborne nickel levels as low as possible.

Avoid repeated skin contact. Wear suitable gloves. Wash skin thoroughly after handling. Launder clothing and gloves as needed. Do not store near acids or reactive substances. Metals can react with acids to liberate hydrogen gas which can form explosive mixtures in air. Metal flake may react explosively or incandescently with substances such as ammonium nitrate, perchlorates, phosphorus, etc.

### **Spill, leak and disposal procedure**

Collect spills by using sweeping compound or by vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if the exhaust is discharged into the workplace. Wear appropriate NIOSH-approved respirators if collection and disposal of spills is likely to cause the concentration of airborne contaminants to exceed the exposure limits. Stainless steel waste is normally collected to recover metal values. Should waste disposal be deemed necessary follow EPA and local regulations.

### **Emergency and first aid procedures**

For skin rashes, seek medical attention. Cleanse wounds thoroughly to remove any particles.

### **SARA Section 313 Supplier Notification**

This product contains the following chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

**Nickel**

**Chromium**

Refer to the Hazardous Ingredients section of this MSDS for the appropriate CAS numbers and percent by weight.

#### **NOVAMET SPECIALTY PRODUCTS CORPORATION**

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Note:

Inco believes that the information in this Material Safety Data Sheet is accurate. However, Novamet makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

Footnotes:

1. OSHA Permissible Limit
2. Threshold Limit Value of the American Conference of Governmental Industrial Hygienists.
3. Describes possible health hazards of the product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.

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Material	Test Species	Total dose, mg/Ni	No. of instillations or injections	No. with tumors/ No. examined
<b>Intratracheal Instillation</b>				
Dust from grinding 18 Cr/10 Ni Stainless Steel, 6.79 Ni, 13.9 Cr, 59.2 Fe	Hamster	2.4	12	0/62
26.8 Ni, 16.2 Cr, 39.2 Fe	"	7.3	12	0/62
	"	10	1	0/100
	"	20	1	0/100
	"	40	1	0/100
	"	80	4	0/100
66.5 Ni, 12.8 Cr, 6.5 Fe	"	10	1	1/100
	"	20	1	8/100
	"	40	1	12/102
	"	80	4	10/100
Nickel Powder	"	9.6	12	1/56
	"	10	1	3/100
	"	20	1	3/100
	"	40	1	10/100
	Rat	6	20	10/39
	"	9	10	8/32
<b>Intramuscular Injection</b>				
Ferronickel (40% Ni)	Rat	14	1	0/20
Nickel Powder	"	14	1	13/20
<b>Intraperitoneal Injection</b>				
32 Ni, 21 Cr, 45 Fe, 0.8 Mn	Rat	50	1	2/33
	"	100	2	1/36
74 Ni, 16 Cr, 7 Fe	"	50	1	12/35
	"	100	2	22/33
Nickel Powder	"	6	1	4/34
	"	12	2	5/34
	"	25	25	25/35
	"	75	10	46/48