

SAFETY DATA SHEET

1. Identification

Product identifier	Model NS-3
Other means of identification	
SDS number	WC045
Recommended use	Brazing rod.
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Manufacturer/Supplier	Worthington Industries Incorporated
Address	200 Old Wilson Bridge Road Columbus, OH 43085 United States
Email:	cylinders@worthingtonindustries.com
Telephone Number:	866-928-2657
CHEMTREC - 24 HOURS:	
Within US and Canada	800-424-9300
Outside US and Canada	+1 703-741-5970 (collect calls accepted)

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 1B
	Specific target organ toxicity, repeated exposure	Category 1 (lung)
Environmental hazards	Not classified.	
Label elements		



Signal word	Danger
Hazard statement	May cause an allergic skin reaction. Suspected of causing cancer. May damage fertility or the unborn child. Causes damage to organs (lung) through prolonged or repeated exposure.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe fumes and dusts. Contaminated work clothing must not be allowed out of the workplace. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection.
Response	IF exposed or concerned: Get medical advice/attention. IF ON SKIN: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Storage	Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Other hazards	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
COPPER, ELEMENTAL	7440-50-8	46-97
Zinc	7440-66-6	45
NICKEL, ELEMENTAL	7440-02-0	7-13
MANGANESE, ELEMENTAL	7439-96-5	1.5
Iron	7439-89-6	1
Silicon	7440-21-3	0.04-0.5

Coating(s)	CAS number	%
Boric acid	10043-35-3	50 - 80
Borax Glass	-	10 - 30
Methacrylate/Apliphatic & Napthenic Hydrocarbon Compound	NA	Proprietary

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation	In case of inhalation of dust or fumes: Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.
Skin contact	Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. If skin rash or an allergic skin reaction develops, get medical attention.
Eye contact	Contact with dust: Rinse immediately with plenty of water for at least 15 minutes. Remove any contact lenses. Get medical attention if irritation develops or persists.
Ingestion	Rinse mouth thoroughly if dust is ingested. Get medical attention if symptoms occur. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Contact with molten material may cause thermal burns.
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Exposure may aggravate pre-existing respiratory disorders. Symptoms may be delayed.
General information	Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Extinguish with foam, carbon dioxide or dry powder.
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media.
Specific hazards arising from the chemical	Fire or high temperatures create: Metal oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do it without risk.
General fire hazards	Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Avoid inhalation of dust from the spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear protective clothing as described in Section 8 of this SDS.
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Methods and materials for containment and cleaning up

Massive, solid metal: Pick up and arrange disposal without creating dust.
 Dust: Collect dust or particulates using a vacuum cleaner with a HEPA filter. Use approved industrial vacuum cleaner for removal. Avoid generation and spreading of dust.
 Recover and recycle, if practical. Keep out of water supplies and sewers.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not contaminate water.

7. Handling and storage**Precautions for safe handling**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear appropriate personal protective equipment (See Section 8). Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Avoid inhalation of dust and fumes. Avoid contact with eyes, skin, and clothing. Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Pregnant women should not work with the product, if there is the least risk of lead exposure. Persons susceptible for allergic reactions should not handle this product. Avoid release to the environment.

Any surface that comes in contact with molten metal must be preheated or specially coated and rust free. Inadvertent contaminants to product such as moisture, ice, snow, grease, or oil can cause an explosion when charged to a molten metal bath or metal furnace (preheating metal will remove moisture from product).

Conditions for safe storage, including any incompatibilities

Store locked up. Store in tightly closed original container in a dry, cool and well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of reach of children. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection**Occupational exposure limits****ACGIH**

Components	Type	Value	Form
COPPER, ELEMENTAL (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
COPPER, ELEMENTAL (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
MANGANESE, ELEMENTAL (CAS 7439-96-5)	TWA	0.1 mg/m ³	Inhalable fraction.
		0.02 mg/m ³	Respirable fraction.
NICKEL, ELEMENTAL (CAS 7440-02-0)	TWA	1.5 mg/m ³	Inhalable fraction.
SODIUM TETRABORATE (CAS 1303-96-4)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
COPPER, ELEMENTAL (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
MANGANESE, ELEMENTAL (CAS 7439-96-5)	TWA	0.2 mg/m ³	
NICKEL, ELEMENTAL (CAS 7440-02-0)	TWA	1.5 mg/m ³	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
COPPER, ELEMENTAL (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
MANGANESE, ELEMENTAL (CAS 7439-96-5)	TWA	0.2 mg/m3	
NICKEL, ELEMENTAL (CAS 7440-02-0)	TWA	0.05 mg/m3	
SODIUM TETRABORATE (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable
	TWA	2 mg/m3	Inhalable
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable
	TWA	2 mg/m3	Inhalable

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
MANGANESE, ELEMENTAL (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
NICKEL, ELEMENTAL (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
SODIUM TETRABORATE (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
COPPER, ELEMENTAL (CAS 7440-50-8)	TWA	1 mg/m3	Dust and fume.
		0.2 mg/m3	Fume.
MANGANESE, ELEMENTAL (CAS 7439-96-5)	TWA	0.2 mg/m3	
NICKEL, ELEMENTAL (CAS 7440-02-0)	TWA	1 mg/m3	Inhalable fraction.
SODIUM TETRABORATE (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
COPPER, ELEMENTAL (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
MANGANESE, ELEMENTAL (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	5 mg/m3	Dust.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
NICKEL, ELEMENTAL (CAS 7440-02-0)	TWA	1 mg/m3	Fume.
Silicon (CAS 7440-21-3)	TWA	1 mg/m3	
SODIUM TETRABORATE (CAS 1303-96-4)	TWA	10 mg/m3	Total dust.
SODIUM TETRABORATE (CAS 1303-96-4)	TWA	5 mg/m3	
Biological limit values	No biological exposure limits noted for the ingredient(s).		
Exposure guidelines	No exposure standards allocated.		
Appropriate engineering controls	Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Keep melting/soldering temperatures as low as possible to minimize the generation of fume. Shower, hand and eye washing facilities near the workplace are recommended.		
Individual protection measures, such as personal protective equipment			
Eye/face protection	Wear safety glasses with side shields (or goggles). Wear a face shield when working with molten material.		
Skin protection			
Hand protection	Wear protective gloves (i.e. latex, nitrile, neoprene).		
Other	Chemical resistant clothing is recommended.		
Respiratory protection	Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the OEL. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.		
Thermal hazards	Heat resistant/insulated gloves and clothing are recommended when working with molten material.		
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.		

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Bare or coated rods.
Color	Bronze.
Odor	Odorless.
Odor threshold	Not applicable.
pH	Not applicable.
Melting point/freezing point	786.2 °F (419 °C) Zinc 1981.4 °F (1083 °C) Copper
Initial boiling point and boiling range	1664.6 °F (907 °C) (Zinc) 4172 °F (2300 °C) (Copper)
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non flammable. Fine particles may form explosive mixtures with air.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not applicable.
Flammability limit - upper (%)	Not applicable.
Explosive limit - lower (%)	Not applicable.
Explosive limit - upper (%)	Not applicable.
Vapor pressure	1 mm Hg @1628°C (Copper) 1 mm Hg @487°C (Zinc)
Vapor density	Not applicable.

Relative density	7.14 (H ₂ O=1) (Zinc) 8.9 (H ₂ O=1) (Copper)
Solubility(ies)	
Solubility (water)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not available.
Viscosity	Not applicable.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Avoid molten metal contact with water.
Incompatible materials	Strong acids. Strong oxidizing agents. Halogenated compounds.
Hazardous decomposition products	Toxic metal oxides are emitted when heated above the melting point.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract. Lung damage and possible pulmonary edema can result from dust exposure. Inhalation of fumes may cause a flu-like illness called metal fume fever.
Skin contact	Dust may irritate skin. May cause an allergic skin reaction. Contact with molten material may cause thermal burns.
Eye contact	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Ingestion	Ingestion of dusts generated during working operations may cause nausea and vomiting. Copper poisoning can result in hemolytic anemia and kidney, liver and spleen damage.

Symptoms related to the physical, chemical and toxicological characteristics	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Sensitization. Contact with molten material may cause thermal burns.
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Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. When heated, the vapors/fumes given off may cause respiratory tract irritation. Acute overexposure to Copper dust/fume can cause irritation of the eyes, nose, throat, and skin and under severe fume overexposure can cause metal fume fever with flu-like symptoms such as sweet metal taste, dry throat, coughing, fever and chills, tight chest, dyspnea, headache, blurred vision, back pain, nausea, vomiting, fatigue. Symptoms usually disappear within 24 hours. Copper may cause skin and hair discoloration. Inhalation of copper dusts may change the gums and mucous lining of the mouth which is generally attributable to localized tissue effect rather than general toxicity.
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Components	Species	Test Results
Iron (CAS 7439-89-6)		
Acute		
<i>Inhalation</i>		
LD50	Rat	> 5 mg/kg
<i>Oral</i>		
LD50	Rat	98.6 g/kg

Components	Species	Test Results
MANGANESE, ELEMENTAL (CAS 7439-96-5)		
Acute		
<i>Inhalation</i>		
LC50/LC90	Rat	> 1500 mg/m ³ , 4 hours
<i>Oral</i>		
LD50	Rat	9000 mg/kg
NICKEL, ELEMENTAL (CAS 7440-02-0)		
Acute		
<i>Oral</i>		
LD50	Rat	> 9000 mg/kg
Silicon (CAS 7440-21-3)		
Acute		
<i>Oral</i>		
LD50	Rat	3150 mg/kg
Zinc (CAS 7440-66-6)		
Acute		
<i>Inhalation</i>		
LC50	Rat	> 5410 mg/m ³
Skin corrosion/irritation	Dust may irritate skin.	
Serious eye damage/eye irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.	
Respiratory or skin sensitization		
Respiratory sensitization	Not classified.	
Skin sensitization	May cause an allergic skin reaction.	
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
Carcinogenicity	May cause cancer.	
ACGIH Carcinogens		
Borax Glass (CAS -)	A2 Suspected human carcinogen.	
Boric acid (CAS 10043-35-3)	A4 Not classifiable as a human carcinogen.	
MANGANESE, ELEMENTAL (CAS 7439-96-5)	A4 Not classifiable as a human carcinogen.	
NICKEL, ELEMENTAL (CAS 7440-02-0)	A5 Not suspected as a human carcinogen.	
Canada - Alberta OELs: Carcinogen category		
Borax Glass (CAS -)	Suspected human carcinogen.	
Canada - Manitoba OELs: carcinogenicity		
Borax Glass (CAS -)	Suspected human carcinogen.	
Boric acid (CAS 10043-35-3)	Not classifiable as a human carcinogen.	
MANGANESE, ELEMENTAL (CAS 7439-96-5)	Not classifiable as a human carcinogen.	
NICKEL, ELEMENTAL (CAS 7440-02-0)	Not suspected as a human carcinogen.	
IARC Monographs. Overall Evaluation of Carcinogenicity		
NICKEL, ELEMENTAL (CAS 7440-02-0)	2B Possibly carcinogenic to humans.	
US. National Toxicology Program (NTP) Report on Carcinogens		
NICKEL, ELEMENTAL (CAS 7440-02-0)	Reasonably Anticipated to be a Human Carcinogen.	
Reproductive toxicity	May damage fertility or the unborn child.	
Specific target organ toxicity - single exposure	Not classified.	
Specific target organ toxicity - repeated exposure	Causes damage to organs (lung) through prolonged or repeated exposure.	
Aspiration hazard	Not relevant, due to the form of the product.	
Chronic effects	Workers allergic to nickel may develop eczema or rashes.	
Further information	No other specific acute or chronic health impact noted.	

12. Ecological information

Ecotoxicity Alloys in massive forms present a limited hazard for the environment. The product contains a substance which is very toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.

Components	Species	Test Results
Zinc (CAS 7440-66-6)		
Aquatic		
Fish	LC50 Rainbow trout, donaldson trout (Oncorhynchus mykiss)	0.24 mg/l, 96 hours

Persistence and degradability The product is not biodegradable.
Bioaccumulative potential No data available.
Mobility in soil Alloys in massive forms are not mobile in the environment.
Other adverse effects None expected.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations.
Hazardous waste code Waste codes should be assigned by the user based on the application for which the product was used.
Waste from residues / unused products Dispose of in accordance with local regulations. Scrapped material should be sent for refining to recover precious metal content. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

TDG Not regulated as dangerous goods.
IATA Not regulated as dangerous goods.
IMDG Not regulated as dangerous goods.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

Canadian regulations This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Not listed.

Precursor Control Regulations

Not regulated.

International regulations

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto protocol

Not applicable.

Montreal Protocol

Not applicable.

Basel Convention

Borax Glass (CAS -)
Zinc (CAS 7440-66-6)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date	17-July-2016
Revision date	-
Version #	01
Further information	The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available.
References	EPA: AQUIRE database NLM: Hazardous Substances Data Base US. IARC Monographs on Occupational Exposures to Chemical Agents HSDB® - Hazardous Substances Data Bank IARC Monographs. Overall Evaluation of Carcinogenicity National Toxicology Program (NTP) Report on Carcinogens ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices
Disclaimer	All information in this Safety Data Sheet is believed to be accurate and reliable. However, no guarantee or warranty of any kind is made with regard to the accuracy of information or the suitability of the recommendations contained herein. It is the user's responsibility to assess the safety and toxicity of this product under their own conditions of use and to comply with all applicable laws and regulations.