

SAFETY DATA SHEET

Metglas[®], Inc.

MBF 60, 62, 64, 67, 601 and 602

Section 1. Identification

GHS product identifier : MBF 60, 62, 64, 67, 601 and 602
Product code : Not available.
Other means of identification : Amorphous Braze Foil
Product type : Massive metal.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Brazing.
Area of application : Industrial applications.

Supplier's details : Metglas, Inc.
440 Allied Drive,
Conway, SC 29526
United States

Telephone: 843-349-6800
www.metglas.com

e-mail address of person responsible for this SDS : john.schwindel@metglas.com and william.coughlan@metglas.com

Emergency telephone number (with hours of operation) : Manufacturer: 800-581-7654 (24/7)
CHEMTREC: 800-424-9300 (24/7)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : H317 SKIN SENSITIZATION - Category 1
H351 CARCINOGENICITY - Category 2
H372 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H317 - May cause an allergic skin reaction.
H351 - Suspected of causing cancer.
H372 - Causes damage to organs through prolonged or repeated exposure. (respiratory tract)

Precautionary statements

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Section 2. Hazards identification

Prevention	: P201 - Obtain special instructions before use. P280 - Wear protective gloves. Wear protective clothing. Wear eye or face protection. P260 - Do not breathe dust. P270 - Do not eat, drink or smoke when using this product.
Response	: P308 + P313 - IF exposed or concerned: Get medical advice or attention. P363 - Wash contaminated clothing before reuse. P302 + P352 - IF ON SKIN: Wash with plenty of water.
Storage	: Not applicable.
Disposal	: P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture	: Mixture
Other means of identification	: Amorphous Braze Foil

Ingredient name	Other names	%	CAS number
Nickel	-	40 - 89.15	7440-02-0
iron	-	0 - 40	7439-89-6
white phosphorus	-	3 - 12	7723-14-0
silicon	-	0 - 10	7440-21-3
molybdenum	-	0 - 5	7439-98-7
boron	-	0 - 2	7440-42-8

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Get medical attention.
Inhalation	: Not applicable.
Skin contact	: Wash with plenty of soap and water. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Cuts should be treated promptly and covered.
Ingestion	: Not applicable.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: Not applicable.
Inhalation	: Not applicable.
Skin contact	: May cause an allergic skin reaction.
Ingestion	: Not applicable.

Over-exposure signs/symptoms

Eye contact	: No specific data.
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Section 4. First aid measures

- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : Do not use water jet.

Specific hazards arising from the chemical : No specific fire or explosion hazard.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
phosphorus oxides
metal oxide/oxides
Vapor (Toxic)

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : No special protection is required.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : No specific hazard.

Methods and materials for containment and cleaning up

- Small spill** : Restack safely. Take care with items that are sharp or heavy.

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Section 6. Accidental release measures

- Large spill** : Restack safely. Take care with items that are sharp or heavy. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Take care with items that are sharp or heavy.
- Advice on general occupational hygiene** : Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store locked up. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Nickel	ACGIH TLV (United States, 3/2019). TWA: 1.5 mg/m ³ 8 hours. Form: Inhalable fraction NIOSH REL (United States, 10/2016). TWA: 0.015 mg/m ³ , (as Ni) 10 hours. OSHA PEL (United States, 5/2018). TWA: 1 mg/m ³ , (as Ni) 8 hours.
iron	None.
white phosphorus	OSHA PEL (United States, 5/2018). TWA: 0.1 mg/m ³ 8 hours. NIOSH REL (United States, 10/2016). TWA: 0.1 mg/m ³ 10 hours.
silicon	NIOSH REL (United States, 10/2016). TWA: 5 mg/m ³ 10 hours. Form: Respirable fraction TWA: 10 mg/m ³ 10 hours. Form: Total OSHA PEL (United States, 5/2018). TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 15 mg/m ³ 8 hours. Form: Total dust
molybdenum	ACGIH TLV (United States, 3/2019). TWA: 10 mg/m ³ , (as Mo) 8 hours. Form: Inhalable fraction TWA: 3 mg/m ³ , (as Mo) 8 hours. Form: Respirable fraction
boron	None.

Section 8. Exposure controls/personal protection

Appropriate engineering controls : No special ventilation requirements. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Not applicable.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location. Wash thoroughly after handling.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Use strong, cut-resistant gloves suitable for handling metals.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Not applicable.

Section 9. Physical and chemical properties

Appearance

Physical state : Solid.

Color : Metallic-gray.

Odor : Odorless.

Odor threshold : Not available.

pH : Not applicable.

Melting point : 878 to 1060°C (1612.4 to 1940°F)

Boiling point : Not available.

Flash point : Not applicable.

Evaporation rate : Not applicable.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : 7.4 to 8.2 [Water = 1]

Density : 7.4 to 8.2 g/cm³

Solubility : Insoluble in the following materials: cold water and hot water.

Section 9. Physical and chemical properties

Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Not available.
Flow time (ISO 2431)	: Not available.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: Reactive or incompatible with the following materials: moisture. Corrosive material
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
iron	LD50 Oral	Rat	750 mg/kg	-
white phosphorus	LD50 Oral	Rat	>10 g/kg	-
silicon	LD50 Oral	Rat	3160 mg/kg	-
molybdenum	LC50 Inhalation Dusts and mists	Rat	>5.84 mg/l	4 hours
	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
boron	LC50 Inhalation Dusts and mists	Rat - Male, Female	>5.08 mg/l	4 hours
	LD50 Oral	Rat	650 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
silicon	Eyes - Mild irritant	Rabbit	-	3 mg	-

Sensitization

Not available.

Mutagenicity

Section 11. Toxicological information

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
Nickel	-	2B	Reasonably anticipated to be a human carcinogen.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
molybdenum	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Nickel	Category 1	inhalation	respiratory tract

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Not applicable.
Inhalation : Not applicable.
Skin contact : May cause an allergic skin reaction.
Ingestion : Not applicable.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : Adverse symptoms may include the following:
 irritation
 redness
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Section 11. Toxicological information

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : Causes damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
MBF 60, 62, 64, 67, 601 and 602	N/A	2500	N/A	N/A	N/A
iron	750	N/A	N/A	N/A	N/A
white phosphorus	5	N/A	N/A	N/A	0.05
silicon	3160	N/A	N/A	N/A	N/A
molybdenum	N/A	2500	N/A	N/A	N/A
boron	650	N/A	N/A	N/A	N/A

Other information : Adverse symptoms may include the following: Metal fume fever if exposed to high concentration of fumes.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Nickel iron	Acute EC50 2 ppm Marine water	Algae - <i>Macrocystis pyrifera</i> - Young	4 days
	Acute EC50 450 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	4 days
	Acute EC50 1000 µg/l Marine water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute IC50 0.31 mg/l Marine water	Crustaceans - <i>Americamysis bahia</i> - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 47.5 ng/L Fresh water	Fish - <i>Heteropneustes fossilis</i>	96 hours
	Chronic NOEC 100 mg/l Marine water	Algae - <i>Glenodinium halli</i>	72 hours
	Chronic NOEC 3.5 µg/l Fresh water	Fish - <i>Cyprinus carpio</i>	4 weeks
	Acute EC50 3700 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	4 days
	Acute LC50 33000 to 100000 µg/l Marine water	Crustaceans - <i>Crangon crangon</i>	48 hours
	Acute LC50 6.48 µg/l Marine water	Fish - <i>Periophthalmus waltoni</i> - Adult	96 hours
Chronic NOEC 100 mg/l Marine water	Algae - <i>Glenodinium halli</i>	72 hours	

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Section 12. Ecological information

white phosphorus	Acute EC50 18.3 mg/l Fresh water	Algae - Desmodesmus subspicatus	72 hours
	Acute NOEC 5 mg/l Fresh water	Algae - Desmodesmus subspicatus	72 hours
molybdenum	Acute LC50 >200000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 800 mg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC 500 mg/l Marine water	Algae - Glenodinium halli	72 hours

Conclusion/Summary : Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
silicon	57 to 77	-	high

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.

Additional information

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): All components are active or exempted.
Clean Water Act (CWA) 307: Nickel; Chromium
Clean Water Act (CWA) 311: white phosphorus

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
white phosphorus	3 - 12	Yes.	100	-	1	-

SARA 304 RQ : 13.3 lbs / 6.1 kg

SARA 311/312

Classification : SKIN SENSITIZATION - Category 1
 CARCINOGENICITY - Category 2
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

Composition/information on ingredients

Name	%	Classification
Nickel	40 - 89.15	SKIN SENSITIZATION - Category 1 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
iron	0 - 40	COMBUSTIBLE DUSTS ACUTE TOXICITY (oral) - Category 4
white phosphorus	3 - 12	FLAMMABLE SOLIDS - Category 2 PYROPHORIC SOLIDS - Category 1 ACUTE TOXICITY (oral) - Category 2 ACUTE TOXICITY (inhalation) - Category 2 SKIN CORROSION - Category 1A

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Section 15. Regulatory information

silicon	0 - 10	SERIOUS EYE DAMAGE - Category 1 FLAMMABLE SOLIDS - Category 2
molybdenum	0 - 5	EYE IRRITATION - Category 2B EYE IRRITATION - Category 2B SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
boron	0 - 2	ACUTE TOXICITY (oral) - Category 4

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Nickel	7440-02-0	40 - 89.15
	Chromium	7440-47-3	10 - 30
	white phosphorus	7723-14-0	3 - 12
Supplier notification	Nickel	7440-02-0	40 - 89.15
	Chromium	7440-47-3	10 - 30
	white phosphorus	7723-14-0	3 - 12

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts

: The following components are listed: NICKEL; NICKEL CATALYST; CHROMIUM; PHOSPHORUS (YELLOW); PHOSPHORUS (WHITE); SILICON DUST; MOLYBDENUM

New York

: The following components are listed: Nickel; Chromium; Phosphorus


New Jersey

: The following components are listed: NICKEL; CHROMIUM; PHOSPHORUS; PHOSPHORUS YELLOW; SILICON; MOLYBDENUM; BORON

Pennsylvania

: The following components are listed: NICKEL CATALYST; CHROMIUM COMPOUNDS; PHOSPHORUS; SILICON; MOLYBDENUM

California Prop. 65

 **WARNING:** This product can expose you to Nickel, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Nickel	-	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Section 16. Other information

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

Health	*	3
Flammability		0
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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



Procedure used to derive the classification

Classification	Justification
SKIN SENSITIZATION - Category 1	Calculation method
CARCINOGENICITY - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1	Calculation method

History

Date of issue/Date of revision	: 06/19/2020
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Prepared by	: Sphera Solutions
Key to abbreviations	: ATE = Acute Toxicity Estimate AMP = Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) N/A = Not available UN = United Nations
References	: HCS (U.S.A.)- Hazard Communication Standard International transport regulations

Indicates information that has changed from previously issued version.

Notice to reader

Section 16. Other information

The Metglas Braze Foil is intended to be used as a braze filler metal in a vacuum or inert atmosphere braze furnace. Since the actual use by others is beyond our control, it is the user's responsibility to determine the suitability of the product for its use and to adopt such safety precautions as may be necessary. Since the conditions of use are not under our control, Metglas disclaims all liability with respect to the use of any material supplied by Metglas.