




MATERIAL SAFETY DATA SHEET

MATERION

1. Chemical product and company identification

A. Product name	C-Foil
Other means of identification	
SDS number	G08
Synonym(s)	Carbon Foil, Graphite Foil
B. Recommended use and Limitations on use	
Recommended use	Industrial uses: Uses of substances as such or in preparations at industrial sites
Limitations on use	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
C. Supplier information	
Company name	Materion Advanced Materials Germany GmbH
Address	Borsigstrasse 10 Alzenau 63755 Germany
Email	Materion.Germany@materion.com
Contact person	Hermann Schmiing
Emergency telephone number	49.60.23.91.82.0
MSDS number	G08

2. Hazards identification

A. Hazard category/Classification		
Physical hazards	Self-heating substances and mixtures	Category 2
Health hazards	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
Environmental hazards	Not classified.	
B. Warning label items including precautionary statement		
• Pictogram		
• Signal word	Warning	
• Hazard statement		
H252	Self-heating in large quantities; may catch fire.	
H335	May cause respiratory irritation.	
• Precautionary statement		
Prevention		
P235 + P410	Observe good industrial hygiene practices.	
P261	Keep cool. Protect from sunlight.	
P271	Avoid breathing dust/fume/gas/mist/vapors/spray.	
P280	Use only outdoors or in a well-ventilated area.	
	Wear protective gloves/protective clothing/eye protection/face protection.	
Response		
	Wash hands after handling.	
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.	
P312	Call a POISON CENTER or doctor/physician if you feel unwell.	
Storage		
	Store away from incompatible materials.	
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.	
P405	Store locked up.	

P407 Maintain air gap between stacks/pallets.
P420 Store away from other materials.

Disposal

P501 Dispose of contents/container (in accordance with related regulations).

C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard) None known.

Supplemental information For further information, please contact the Product Stewardship Department at +1.216.383.4019.

3. Composition/information on ingredients

Chemical identity	Common and alternative names	CAS number	ID number	Content in percent (%)
Carbon		7440-44-0	KE-04671	100

4. First aid measures

A. In case of eye contact Rinse with water. Get medical attention if irritation develops and persists.

B. In case of skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

C. In case of inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

D. In case of swallowing Rinse mouth. Get medical attention if symptoms occur.

E. Note to physician Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

Most important symptoms/effects, acute and delayed May cause respiratory irritation. Coughing. Under normal conditions of intended use, this material does not pose a risk to health.

General advice If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media Do not use water as an extinguisher.

B. Specific hazards arising from the chemical (example: hazardous combustion products) This product is not flammable.

C. Specific methods of fire-fighting

Special protective equipment for firefighters Wear suitable protective equipment.

Special fire fighting procedures Move containers from fire area if you can do so without risk.

General fire hazards Self-heating in large quantities; may catch fire. Not relevant, due to the form of the product.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency measures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the MSDS.

B. Environmental precautions Avoid discharge into drains, water courses or onto the ground. Not relevant, due to the form of the product.

C. Methods and materials for containment and cleaning up The product is immiscible with water and will spread on the water surface. Stop the flow of material, if this is without risk. Following product recovery, flush area with water. For waste disposal, see section 13 of the MSDS.

7. Handling and storage

- A. Precautions for safe handling** Minimize dust generation and accumulation. Keep cool. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
- B. Conditions for safe storage (including any incompatibilities)** Store locked up. Store in a cool, dry place out of direct sunlight. Store in a closed container away from incompatible materials. Store in tightly closed container. Store away from other materials. Maintain air gap between stacks/pallets.

8. Exposure controls/personal protection

A. Exposure limit values, biological limit values, etc

Korea. OELs. Standards for Exposure to Chemical Substances and Physically Hazardous Factors

Material	Type	Value	Form
C-Foil	TWA	2 mg/m3	Respirable fraction.
Components	Type	Value	Form
Carbon (CAS 7440-44-0)	TWA	2 mg/m3	Respirable fraction.

Biological limit values No biological exposure limits noted for the ingredient(s).

B. Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

C. Personal protective equipment

- **Respiratory protection** In case of insufficient ventilation, wear suitable respiratory equipment.
- **Eye protection** Wear eye/face protection.
- **Hand protection** Wear appropriate chemical resistant gloves.
- **Body protection** Wear suitable protective clothing.

Hygiene measures 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

A. Appearance

Physical state	Solid.
Form	Solid.
Color	Dark grey.

B. Odor None.

C. Odor threshold Not applicable.

D. pH Not applicable.

E. Melting point/freezing point

Melting point 6332 °F (3500 °C) estimated

F. Boiling point, initial boiling point, and boiling range Not applicable.

G. Flash point Not applicable.

H. Evaporation rate Not applicable.

I. Flammability (solid, gas) None known.

J. Upper/lower limit on flammability or explosive limits

Flammability limit - lower (%) Not applicable.

Flammability limit - upper (%) Not applicable.

Explosive limit - lower (%) Not applicable.

Explosive limit - lower (%) temperature Not applicable.

Explosive limit - upper (%) Not applicable.

Explosive limit - upper (%) temperature	Not applicable.
K. Vapor pressure	Not applicable.
L. Solubility	
Solubility (water)	Insoluble
M. Vapor density	Not applicable.
N. Specific gravity	Not available.
O. n-octanol/water partition coefficient	Not applicable.
P. Auto-ignition temperature	Not applicable.
Q. Decomposition temperature	Not applicable.
R. Viscosity	Not applicable.
S. Molecular weight	12.01 g/mol
Other data	
Explosive limit	Not applicable.
Explosive properties	Not explosive.
Molecular formula	C
Oxidizing properties	Not oxidizing.
Relative density	Not applicable.

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

A. Stability and hazardous reaction potential

Stability Material is stable under normal conditions.
Hazardous reaction potential No dangerous reaction known under conditions of normal use.

B. Conditions to avoid (e.g. static discharge, shock or vibration, etc) Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.

C. Incompatible materials Oxygen. Chlorine.

D. Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

A. Information on likely routes of exposure

- **Respiratory organs** May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
- **Skin** No adverse effects due to skin contact are expected.
- **Eyes** Not likely, due to the form of the product.
- **Mouth** Expected to be a low ingestion hazard.

B. Information on health hazards

- **Acute toxicity (list all possible routes of exposure)** Not known.

Product	Species	Test Results
C-Foil		
<u>Acute</u>		
Oral		
LD50	Rat	> 10000 mg/kg

Components	Species	Test Results
Carbon (CAS 7440-44-0)		
<u>Acute</u>		
Oral		
LD50	Rat	> 10000 mg/kg
• Corrosivity or irritation to the skin	Not likely, due to the form of the product.	
• Serious eye damage/eye irritation	Not likely, due to the form of the product.	
• Respiratory sensitization	Not a respiratory sensitizer.	
• Skin sensitization	Not a skin sensitizer.	
• Carcinogenic properties /Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
• Mutagenic properties /Mutagenicity	Based on available data, the classification criteria are not met.	
• Reproductive toxicity	Not classified.	
• Specific target organ toxicity - single exposure	May cause respiratory irritation.	
• Specific target organ toxicity - repeated exposure	Not classified.	
• Aspiration hazard	Not an aspiration hazard.	
12. Ecological information		
A. Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.	
Hazardous to the aquatic environment, acute hazard	Not relevant, due to the form of the product.	
B. Persistence/degradability	No data is available on the degradability of this substance.	
C. Bioaccumulative potential	No data available.	
D. Mobility in soil	The product is immiscible with water and will spread on the water surface. No data available for this product.	
E. Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.	
13. Disposal considerations		
A. Method of disposal	Consult authorities before disposal. Dispose of contents/container (in accordance with related regulations).	
B. Disposal considerations (including disposal of contaminated containers or packaging)	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.	
Waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.	
14. Transport information		
IATA		
A. UN number	Not applicable.	
B. UN proper shipping name	Not applicable.	
C. Transport hazard class(es)		
Class	Not applicable.	
Subsidiary risk	-	
D. Packing group	Not applicable.	
E. Environmental hazards	No.	
F. Special precautions for user	Not applicable.	

IMDG

- A. UN number Not applicable.
B. UN proper shipping name Not applicable.
C. Transport hazard class(es)
 Class Not applicable.
 Subsidiary risk -
D. Packing group Not applicable.
E. Environmental hazards
 Marine pollutant No.
EmS Not applicable.
F. Special precautions for user Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

A. Restrictions under the Industrial Safety and Health Law

Harmful Substances Prohibited from Manufacturing

Not regulated.

Harmful Substances Requiring Permission for Manufacture or Use

Not regulated.

Controlled Hazardous Substances

Not regulated.

Harmful Substances Requiring Special Medical Examination

MINERAL DUST (CAS 7440-44-0) Dust

Workplace Environmental Monitoring Harmful Materials

Not regulated.

Occupational Exposure Limit

Carbon (CAS 7440-44-0)

B. Restrictions under the Chemicals Control Law (Previously Toxic Chemicals Control Law)

Accidental Release Prevention Substances

Not regulated.

Act on the Registration and Evaluation of Chemicals

Banned Toxic Chemicals

Not regulated.

Designated Existing Chemicals Subject to Registration (PEC) (MoE No. 2015-92)

Not listed.

Restricted Chemical Substances

Not regulated.

Toxic Chemicals

Not regulated.

C. Restrictions under the Dangerous Substance Safety Management Act

D. Restrictions under the Wastes Control Act

Halogenated Materials in Waste Organic Solvents

Not regulated.

Hazardous Substances

Not regulated.

E. Restrictions under other foreign or domestic laws

Clean Air Conservation Act

Air Pollutants

Carbon (CAS 7440-44-0)

Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides (Rules on PIC, MoE No. 2014-252, Dec. 31, 2014; Standards for Pesticides, RDA No. 2014-26), as amended

Not listed.

Specific Air Pollutants

Not regulated.

Further information This material safety data sheet was prepared in accordance with Article 41 of the Industrial Safety and Health Law.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Korea	Existing Chemicals List (ECL)	Yes

*A "Yes" indicates that all components of this product comply 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

Bibliography

ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
Korea. Accidental Release Prevention Substances (Presidential Decree of Toxic Chemical Control Law, Executive Order No. 19203)
Korea. Dangerous Substances Threshold Quantity (Presidential Decree of Dangerous Substances Safety Management Act No. 18406, Schedule 1)
Korea. Harmful Substances Prohibited from Manufacturing (Presidential Decree on the Industrial Safety and Health Act (No. 13053), Article 29)
Korea. Harmful Substances Requiring Permission for Manufacture or Use (Presidential Decree on the Industrial Safety and Health Act (No. 13053), Article 30)
Korea. OELs. Regulation for Permitted Concentration of Hazardous Substances (Ministry of Labor (MOL) Public Notice No. 1986-45, as amended)
Korea. Prohibited Chemical Substances (TCCL Article 11)
Korea. Regulated volatile organic compounds (VOCs) (MOE Notice No. 2001-36, March 8, 2001, as amended)
Korea. Restricted Chemical Substances (TCCL Article 11)
Korea. Toxic Chemical Control Law (TCCL), Existing Chemicals Inventory (KECI)
Korea. Toxic Chemical Control Law (TCCL), pre-1997 List
Korea. Toxic Chemicals (TCCL Article 10)
Korea. Toxic Release Inventory (TRI) Chemicals (TCCL Article 14)
Korea. Accidental Release Prevention Substances (Pres. Decree of Toxic Chemical Control Law, Ex. Order No. 19203, Tables 2 & 3, Dec 28, 2005)
Korea. OELs (ISHL Article 42; MOL Public Notice No. 1986-45, as amended through MOEL Notice 2013-38, August 14, 2013)
Korea. Prohibited Chemical Substances (AREC "K-REACH" Article 27; Designation of Toxic, Restricted or Banned Chemicals Appendices 4 and 5)
Korea. Restricted Chemical Substances (AREC "K-REACH" Article 27; Designation of Toxic, Restricted or Banned Chemicals Appendices 2 and 3)
KECI, January 27, 2015, amended through MoE 2016-138, July 13, 2016
Korea. Toxic Chemicals (AREC "K-REACH" Article 20; Designation of Toxic, Restricted or Banned Chemicals Appendix 1)
Korea. Toxic Release Inventory (TRI) Chemicals (MOE Public Notice No. 2002-166, Nov. 8, 2002)

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