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SAFETY DATA SHEET (SDS)

G10/ FR4 EPOXY GLASS

Prepared in accordance with the Globally Harmonized System (GHS) and Safe Work Australia requirements.

SECTION 1: IDENTIFICATION

- **Product Name:** G10/ FR4 Epoxy Glass
- **Recommended Use:** Electrical insulation, structural panels, mechanical support, high-voltage barriers.
- **Details:**
    - **Company:** MISCO Australia
    - **Address:** 89 -91 Licola Crescent, Dandenong South, VIC 3175
    - **Telephone Number:** 03 9706 5185
    - **Email:** info@misco.net.au
    - **Website:** www.misco.net.au
    - **Emergency Contact Number:** 000
    - **Poisons Information Centre**: 13 11 26 (Australia)
- **SDS Number:** MISCO – SDS - 007
- **SDS Version:** 1

SECTION 2: HAZARD(S) IDENTIFICATION

Classification (GHS – Safe Work Australia):

- Not classified as hazardous in solid, finished sheet form
- Not classified as dangerous goods under the ADG Code

Hazards During Processing (Machining, Cutting, Heating):

- **Skin Irritation** – Category 2B (dust)

- **Eye Irritation** – Category 2B (dust)
- **Respiratory Irritation** – Category 3 (airborne fibres/dust)
- **Thermal Degradation Risk** – May release low levels of aldehydes or phenols if overheated (>250°C)

GHS Label Elements (applicable during machining exposure):

- **Signal Word:** ⚠ *WARNING.*
- **Hazard Pictograms:**
- **Hazard Statements:**
  - H335: May cause respiratory irritation (inhaled dust)
  - H315: Causes skin irritation (mechanical)
  - H319: Causes eye irritation.
  - H351: Suspected of causing cancer (formaldehyde, trace release at high temperatures)
- **Precautionary Statements:**
  - P261: Avoid breathing dust or fumes.
  - P280: Wear protective gloves, clothing, and eye/face protection.
  - P271: Use only in well-ventilated areas.
  - P285: In case of inadequate ventilation, wear respiratory protection.
  - P304 + P340: If inhaled, remove person to fresh air and keep at rest
  - P305 + P351 + P338: If in eyes, rinse cautiously with water for several minutes
  - P501: Dispose of contents/container in accordance with local regulations

Other Hazards:

- Not combustible in sheet form, but thermal decomposition can produce carbon monoxide, carbon dioxide, phenol, and aldehydes.
- Does **not** contain halogenated flame retardants.
- Dust is classified as a nuisance particulate—use local ventilation and PPE during machining.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substance: Solid thermoset composite of epoxy resin and woven glass fabric.

Component	CAS Number	Proportion (% w/w)	Function
Epoxy Resin (BPA-based)	25068-38-6	40–60%	Binding matrix (thermoset polymer)
Woven E-glass Cloth	65997-17-3	40–60%	Structural reinforcement (fibreglass)
Flame Retardant (non-halogenated)	Proprietary	<5%	Fire performance additive (FR4 only)
Formaldehyde (trace by-product)	50-00-0	<0.1% (when heated)	Potential decomposition product at >250°C

Note:

- The exact proportion of ingredients may vary slightly due to the nature of the manufacturing process.
- No free formaldehyde or VOCs are present under normal handling.
- Material is inert and stable in cured form.
- FR4 variant uses a non-halogenated flame-retardant system to achieve UL 94 V-0.

SECTION 4: FIRST AID MEASURES

Description of necessary first aid measures:

- **Inhalation:**
  If dust or fumes are inhaled, move the affected person to fresh air. Keep at rest and comfortable for breathing. If breathing difficulties persist or symptoms such as coughing or irritation occur, seek medical attention. Administer oxygen if available and trained to do so.

- **Skin Contact:**
  Wash affected skin area thoroughly with mild soap and water. Do not use solvents. Remove contaminated clothing and wash before reuse. Seek medical attention if irritation develops or persists.
- **Eye Contact:**
  Immediately flush eyes with plenty of clean water for at least 15 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention if irritation continues or vision changes occur.
- **Ingestion:**
  Unlikely due to solid form. If swallowed, rinse mouth with water. Do not induce vomiting. Seek medical attention if symptoms develop or if large quantities are ingested.

Symptoms caused by exposure:

- **Inhalation of dust:** Mechanical respiratory irritation – coughing, throat discomfort, or sneezing.
- **Skin contact:** Abrasion or mechanical irritation from glass fibres.
- **Eye contact:** Redness, tearing, foreign-body sensation due to fine dust or particles.
- **Thermal degradation exposure:** Irritation of eyes, nose, or throat due to vapour or gas release (e.g. formaldehyde, phenol).

Medical attention and special treatment needed:
No specific antidote. Treat symptomatically based on clinical judgment. For suspected overexposure to thermal decomposition products, monitor respiratory status. Inhalation of high-temperature vapours may require observation for delayed onset respiratory effects.

SECTION 5: FIREFIGHTING MEASURES

Suitable Extinguishing Media:

- Water spray
- Dry chemical powder
- Carbon dioxide (CO_2)
- Foam

Unsuitable Extinguishing Media:

- Do not use water jet directly on burning material as it may spread the fire.

Specific Hazards Arising from the Material:
Although the product is not classified as flammable, it can burn under prolonged high heat.

- Decomposition at high temperatures may release:
    - Carbon monoxide (CO)
    - Carbon dioxide (CO_2)
    - Phenolic vapours
    - Aldehydes (including formaldehyde)
    - Organic acids
    - Smoke and irritating fumes

Note: Halogen-free FR4 does **not** emit hydrogen bromide or halogenated by-products.

Special Protective Equipment and Precautions for Firefighters:

- Use **self-contained breathing apparatus (SCBA)** and full protective firefighting gear.
- Evacuate personnel in the area and fight fire from a safe distance.
- Cool exposed materials with water spray to prevent decomposition vapours from spreading.

Hazchem Code: Not applicable

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures:

- Avoid generating dust.
- Ensure adequate ventilation in the area.
- Wear appropriate personal protective equipment (PPE), including:
    - Safety goggles
    - P2 dust mask or respirator
    - Protective gloves and clothing

- Prevent contact with skin and eyes.
- Avoid inhalation of airborne dust particles.

Environmental Precautions:

- Prevent dust or debris from entering drains, waterways, or soil.
- Dispose of waste in accordance with local environmental regulations.
- Avoid uncontrolled disposal through incineration or landfill without proper authorisation.

Methods and Materials for Containment and Cleaning Up:

- Collect solid pieces manually using tools or vacuum systems.
- For dust: Use **HEPA-filtered industrial vacuum** or **wet sweeping** to minimise airborne dispersion.
- Do not use compressed air to clean surfaces.
- Place waste and sweepings in sealed, labelled containers for disposal.
- Wash hands and exposed areas thoroughly after clean-up.

SECTION 7: HANDLING AND STORAGE

Handling:

- No special handling required for unprocessed sheets.
- During machining:
    - Use **local exhaust ventilation (LEV)** or dust collection.
    - Wear appropriate PPE: **P2 respirator**, **gloves**, **goggles.**
    - Avoid generating and inhaling dust.
    - Do not eat, drink, or smoke while handling machined material or dust.
    - Wash hands and exposed skin after handling.

Storage:

- Store sheets flat in a cool, dry, and well-ventilated location
- Avoid stacking heavy objects on thinner sheets to prevent warping
- Protect from:
    - Moisture and condensation
    - Direct sunlight or UV exposure
    - High ambient temperatures (>50°C)
- Keep away from strong oxidising agents, acids, and bases

Incompatibilities:

- **Strong oxidising agents** (e.g. peroxides, chlorine compounds) – may cause degradation.
- **Strong acids and bases** – prolonged contact may affect resin surface or structural integrity.
- **High temperature sources** – can lead to thermal decomposition (>250°C)

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits: Control Parameters (Safe Work Australia – Workplace Exposure Standards):

Substance	TWA	STEL	Notes
Nuisance dust (inhalable)	10 mg/m^3	—	Applicable during machining
Respirable dust	3 mg/m^3	—	Applicable during fine machining
Formaldehyde (if released during thermal degradation)	1.0 ppm	2.0 ppm	Carcinogen (IARC Group 1)

Engineering Controls:

- Use **local exhaust ventilation (LEV)** during all machining operations.
- Ensure general workshop ventilation is adequate.
- Avoid recirculating unfiltered air containing dust or vapour.
- Use **HEPA filtration** on vacuum and dust collection systems.

PPE:

- **Eye Protection:**
  Safety goggles or face shield (AS/NZS 1337 compliant) when cutting, grinding, or sanding.
- **Respiratory Protection:**
  P2 respirator or equivalent (AS/NZS 1716) when machining or if dust is present.
- **Skin Protection:**
  Impervious gloves (e.g. nitrile or PVC) and long sleeves to avoid contact with dust or fibres.
- **Hygiene Measures:**
  - Wash hands and exposed skin after handling.
  - Do not eat, drink, or smoke in processing areas.
  - Launder contaminated clothing before reuse.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Property	Value
Appearance:	Solid, rigid sheet; typically, green or amber
Odour:	Odourless in solid form; may emit slight odour when heated
pH:	Not applicable
Boiling Point:	Not applicable
Melting Point:	Not applicable (thermoset – does not melt)
Flash Point:	Not flammable in solid form
Evaporation Rate:	Not applicable
Flammability (solid, gas):	Not classified as flammable
Upper/Lower Flammability or Explosive Limits:	Not applicable
Vapour Pressure:	Not applicable
Vapour Density:	Not applicable
Relative Density:	~1.8 (ASTM D792)
Specific Gravity:	1.8 g/cm^3
Solubility:	Insoluble in water
Partition Coefficient (n-octanol/water):	Not applicable
Auto-ignition Temperature:	>300°C
Decomposition Temperature:	>250°C (may emit formaldehyde, phenol, CO/CO_2)
Viscosity:	Not applicable

SECTION 10: STABILITY AND REACTIVITY

Reactivity:

- Not reactive under normal handling and storage conditions.
- Stable as a cured thermoset laminate.

Chemical Stability:

- Stable under recommended storage conditions.
- Resistant to degradation under ambient temperature and humidity.

Possibility of Hazardous Reactions:

- No dangerous reactions expected under normal use.
- Does not polymerise or decompose spontaneously.

Conditions to Avoid:

- Temperatures exceeding **250°C** (may lead to thermal decomposition)
- Prolonged exposure to **UV light**, high humidity, or mechanical stress
- Open flame, ignition sources, or hot surfaces

Incompatible Materials:

- Strong oxidising agents (e.g., peroxides, nitric acid)
- Strong acids and alkalis (especially at elevated temperatures)

Hazardous Decomposition Products:

- Carbon monoxide (CO)
- Carbon dioxide (CO_2)
- Phenol and substituted phenolics.

- Aldehydes, including trace formaldehyde.
- Organic vapours

SECTION 11: TOXICOLOGICAL INFORMATION

Likely Routes of Exposure:

- Inhalation of machining dust or thermal vapours
- Skin or eye contact with fibres or particulates
- Ingestion is unlikely and not a typical route.

Acute Health Effects:

- **Inhalation:** Dust may cause respiratory tract irritation (coughing, sneezing, throat discomfort)
- **Skin Contact:** Mechanical irritation, itching, or redness from fibreglass particles
- **Eye Contact:** Dust may cause temporary eye irritation, redness, or watering.
- **Ingestion:** Low toxicity; no significant hazard expected in solid form

Chronic Health Effects:

- Prolonged inhalation of respirable dust may lead to chronic irritation or aggravate pre-existing respiratory conditions.
- Formaldehyde (released only during thermal decomposition) is a **Group 1 IARC carcinogen.**
- No long-term adverse effects expected from solid, handled material.

Toxicological Data (for decomposition by-products):

- **Formaldehyde (CAS 50-00-0):**
  - Carcinogenicity: IARC Group 1
  - STEL: 2 ppm
  - TWA: 1 ppm

Sensitisation:

- Not expected to cause skin or respiratory sensitisation in cured form.
- Epoxy resin dust may cause mild sensitisation in rare cases.

Mutagenicity / Reproductive Toxicity:

- No known mutagenic or reproductive risks in solid, cured form.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:

- No known significant effects on aquatic or terrestrial organisms in solid form
- Dust or fragments should not be released into waterways or soil.

Persistence and Degradability:

- **Not biodegradable**
- Epoxy resin and glass fibre components are chemically stable and persist in the environment.

Bioaccumulative Potential:

- Low potential for bioaccumulation
- Components are inert and not biologically active in cured form.

Mobility in Soil:

- Low mobility due to solid, non-dispersible form
- Dust may settle but does not migrate in soil or water.

Other Adverse Effects:

- No known ozone depletion or endocrine disruption potential

- Does not contribute to photochemical smog or aquatic toxicity under normal use.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal of Product:

- Dispose of cured sheets, offcuts, or machining waste as **non-hazardous industrial solid waste**, in accordance with local, state, and federal regulations
- Do **not incinerate** in open or uncontrolled conditions—thermal breakdown may release irritant vapours.
- Landfill disposal is acceptable where permitted for inert materials.

Disposal of Packaging:

- Recycle cardboard and plastic wrapping where facilities exist.
- If contaminated with dust, dispose of as general waste.

Special Precautions:

- Avoid release of machining dust into drains, stormwater, or soil
- Use sealed, labelled containers for large volumes of scrap or processed waste.

Regulatory Notes:

- Not classified as hazardous waste under Australian environmental regulations in solid form
- Check with local environmental authority for any volume-based restrictions.

SECTION 14: TRANSPORT INFORMATION

UN Number	**Not applicable**
Proper Shipping Name	Not regulated for transport
Transport Hazard Class(es)	Not applicable
Packing Group	Not applicable
Hazchem Code	Not applicable

Additional Notes:

- Product is **not classified as dangerous goods** under the ADG Code, IMDG, or IATA regulations.
- No special handling requirements for transport
- Ensure sheets or parts are **secured** during transit to avoid movement, breakage, or dust generation.
- Protect from **excessive moisture and physical damage.**

SECTION 15: REGULATORY INFORMATION

Safety, Health, and Environmental Regulations Specific for the Product:

- **Australia WHS Classification (GHS):**
  Not classified as hazardous in solid form under the Globally Harmonized System (GHS) adopted by Safe Work Australia.
- **Australian Inventory of Industrial Chemicals (AIIC):**
  Components such as **epoxy resin (CAS 25068-38-6)** and **glass fibre (CAS 65997-17-3)** are listed.
- **Poisons Schedule (SUSMP):**
  Not scheduled.
- **ADG Code (Transport):**
  Not classified as dangerous goods.

International Regulations:

- **REACH (EU):**
  Product is a manufactured article; not subject to registration.
- **RoHS Directive (EU):**
  Compliant – does not contain restricted substances above allowable thresholds.
- **TSCA (USA):**
  Ingredients are listed or exempt.

Other Classifications:

- **IARC:**
  Formaldehyde (only released under thermal decomposition) is listed as **Group 1 – Carcinogenic to humans**.
- **Ozone-Depleting Substances:**
  None present.

SECTION 16: OTHER INFORMATION

- **Date of Preparation:** 14.8.2025
- **Revision Number:** 1
- **Key Abbreviations and Acronyms:**
  - GHS – Globally Harmonized System of Classification and Labelling of Chemicals
  - WHS – Work Health and Safety
  - ADG – Australian Dangerous Goods Code
  - AIIC – Australian Inventory of Industrial Chemicals
  - REACH – Registration, Evaluation, Authorisation and Restriction of Chemicals
  - RoHS – Restriction of Hazardous Substances
  - IARC – International Agency for Research on Cancer
  - PPE – Personal Protective Equipment
  - TWA – Time-Weighted Average
  - STEL – Short-Term Exposure Limit

DISCLAIMER

The information contained in this Safety Data Sheet (SDS) is provided by MISCO Australia in good faith and is believed to be accurate and reliable as of the date of issue. The information is based on current knowledge and is intended to describe the product solely in terms of health, safety, and environmental requirements. It does not represent any guarantee of the product's properties or suitability for a specific application.

This SDS is intended as a guide for the safe handling, use, storage, transport, and disposal of the material. It is the responsibility of the user to assess the suitability of the material for any intended purpose and to ensure that working conditions comply with applicable laws, standards, and safety practices.

Important Notes:

- *MISCO Australia makes no warranties, express or implied, and assumes no liability for the accuracy or completeness of the data or for any damages resulting from the use of the product or the information provided in this SDS.*
- *This document is not intended to serve as a substitute for proper training, risk assessment, or professional judgement in the use of chemical and composite materials.*
- *Users must ensure that they understand and comply with all local, state, and federal regulations, as well as workplace safety procedures when handling this product.*
- *Where this material is used as part of a larger system or process, additional hazards may exist that are not covered in this SDS. It is the user's responsibility to assess the entire context in which the product is used.*

MISCO Australia reserves the right to revise Safety Data Sheets in response to new information, changes in legislation, or updated risk assessments without prior notice. The most current version of this SDS supersedes all previous versions and should be consulted before each use of the product.

END OF SAFETY DATA SHEET.