Nickel Graphite Conductive Caulk

AS-NCS001 is an electrically conductive composite material comprising of silicone elastomer and nickel-plated graphite particles. It is designed to be easily applied to panel joints / seams and or the small clearances that result from non-continuous mechanical fixing in sheet metal enclosures. On application it cures at room temperature to form an elastomeric section / joint that has good adhesion to most commonly used metals / substrates. When fully cured it will prevent water ingress and improve the EMI shielding performance of panel joints / overlaps.

AS-NCS001 has excellent high temperature resistance and long-term ageing characteristics. The nickel-graphite filler used in this material is very resistant to corrosion and has good galvanic compatibility with commonly used materials such as aluminium alloys

Cured Properties

Density	2.2gcm^{-3}
Hardness	60 Shore A
Volume resistivity	<0.5Ω.cm
Adhesion	>100 Ncm^{-2}
Attenuation – 100MHz to 10GHz (MIL-STD 285)	70 – 110dB (typically)
Elongation	100%
Service temperature range	-55°C to 150°C

Packaging

AS-NCS001 is normally supplied in 170ml Semco cartridges from which it can be directly applied using a suitable caulking gun.

Storage

It is recommended that when not in use that the material is stored in a cool dark, dry place. If the facility exists then some form of refrigerated or freezer storage is ideal. If kept properly sealed and in a suitable location then the material will remain usable for up to 6 weeks.

Handling

When using this material observe usual standards of industrial hygiene/practice. Avoid skin/eye contact and work in a well-ventilated area

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Material Safety Data –

1. Identification of the Substance and of the company -

Trade name AS-NCS001 CONDUCTIVE SILICONE CAULK

Description Viscous single component silicone material filled with electrically conductive nickel coated graphite particles

Formula Mixture

Manufacturer / Company
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CM9 4LJ
ENGLAND

Tel: 01376 550525
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2. Hazards Identification - Potential Health Effects

Ingestion	Low order of toxicity
Skin Contact	Prolonged or frequent contact may result in skin sensitization, irritation and dermatitis
Eye Contact	Causes eye irritation – see note below in section 11 concerning contact lenses
Inhalation	No hazard if used as directed – if the cured material is ground or abraded it is recommended that appropriate respiratory protection is used

3. Material Composition -

Chemical Name	CAS-No.	EC EINECS No.	Symbol	%(W/W)	R-phrases
Nickel (Ni)	7440-02-0	231-111-4	X_n	>50	R36 R37 R38 R40 R42 R43
Graphite	7782-42-5	231-955-3	-	>25	
Amorphous silica (SiO_2)	7631-86-9	231-545-4	-	<5	R20
Xylene	1330-20-7	215-535-7	X_n	<5	R10 R20 R22 R36 R37 R38

Note: This material is a homogenous polymer mixture and both the nickel metal and silica constituents are fully encapsulated within the polymer. This greatly reduces any harmful effect that might otherwise have as free powders e.g. there is virtually no inhalation risk unless the material is abraded or thermally decomposes

Chip classification risk (R) phrases

R10	Flammable
R20	Harmful by inhalation
R22	Harmful if swallowed
R36	Irritating to eyes
R37	Irritating to respiratory system
R38	Irritating to the skin
R40	Limited evidence of a carcinogenic effect
R42	May cause sensitisation by inhalation
R43	May cause sensitisation by skin contact

4. First-Aid Measures

Obtain medical attention in severe cases or if symptoms persist

Ingestion	Obtain medical attention
Skin Contact	Remove excess with dry cloth or paper towel – then wash with detergent and water
Eye Contact	Immediately flush eyes with plenty of water for at least 15 minutes and obtain medical attention
Inhalation	Remove to fresh air If not breathing, give artificial respiration and obtain immediate medical attention

5. Fire-Fighting Measures

Extinguishing Media	Carbon dioxide (CO_2), dry chemical or foam
Special Fire-Fighting Procedures	Wear positive pressure, self-contained breathing apparatus and protective clothing. Combustion of this product will generate toxic fumes
Hazardous Combustion Products	Material is essentially non-flammable, however, exposure to fire or flame will result in the generation of a mixture of decomposition products (fumes/gases). The types and concentration of these products will vary depending on the temperature or degree of confinement but are generally likely to contain the following constituents: Carbon dioxide (CO_2) Carbon monoxide (CO) Hydrocarbons and organic compounds of indeterminate composition Silica (SiO_2) Traces of incompletely burned or semi decomposed carbon compounds

Even if this material is not exposed directly to fire, temperatures of approximately 300°C or greater may cause toxic fumes to be generated.

6. Accidental Release Measures

Action To Be Taken If Material Is Released Or Spilled:

- Wear suitable protective clothing, chemical resistant gloves and goggles
- Wear appropriate respiratory protection in enclosed areas or if there is insufficient ventilation
- Wipe, scrape or soak up in an inert material and put into a container for disposal in accordance with regulations
- The container should be sealed, labelled and stored in a cool, well-ventilated area to await disposal
- Warn other personnel of the spill and instruct them to leave the area.
- Wash walking surfaces with detergent and water, after material pickup is complete, to reduce slipping hazard

7. Handling & Storage

Precautions to be Taken in Handling & Storage:

- Avoid breathing vapours; if exposed to high vapour concentration, leave area at once
- Avoid contact with skin and eyes
- Use only in a well-ventilated area
- Store in a cool, dry, dark area
- Keep container closed when not in use
- Do not allow contact with acidic, basic or oxidizing material

8. Exposure Controls / Personal Protection

Occupational exposure limits for methanol
TWA (8 hour exposure limit): 266 mg/m^3 (OES)
STEL (15 minute exposure limit): 333 mg/m^3 (OES)

Engineering Controls	Exhaust ventilation Eye wash stations
Respiratory Protection	Only required if the product is used in large quantities and/or in a confined location, otherwise ensure that the material is used in an open and or well-ventilated area that prevents any build-up of fumes or vapours above the recommended time weighted average (TWA) or maximum short term exposure limits (STEL). If applied engineering controls are inadequate in this respect then appropriate respiratory protection must be worn.
Protective Gloves	Light weight latex or nitrile if necessary
Eye & Face Protection	Safety glasses
Other Protective Equipment	Laboratory coat, apron or good quality disposable protective overalls
Ventilation	Use only in well-ventilated area – use mechanical ventilation if required

9. Physical & Chemical Properties

Appearance	Dark grey solid
Odour	Not applicable
pH	Not applicable
Boiling point	Not applicable
Melting point	Not applicable
Flash point	Not applicable
Flammability	Not determined
Auto flammability	Not applicable
Explosive properties	Not explosive
Oxidising properties	Not oxidizing
Partition coefficient	Not applicable
Density	2.0 gcm^{-3}
Magnetic properties	Ferromagnetic
Solubility in water	Insoluble

10. Stability & Reactivity

Hazardous Thermal Decomposition / Combustion Products:

- Carbon dioxide (CO_2)
- Carbon monoxide (CO)
- Silicon dioxide (SiO_2)
- Nitrogen oxides
- Ammonia
- Methanol
- Hydrocarbons
- Methanal (CH2O, Formaldehyde) may be evolved if the uncured material is exposed to temperatures above 150°C

Incompatibility (Materials to Avoid):

- Acidic agents
- Basic agents(Bases/alkalis)
- Oxidizing agents
- Carbon monoxide
- Contact with water will initiate curing process

11. Toxilogical Information

Acute Toxicity Nickel metal (Ni) – Oral LD_{50} rat >9000mg/kg

Ingestion	Reacts with moisture to form methanol – risk of serious effects at doses above 200mg/kg
Skin Contact	Some individuals are sensitive to contact with nickel metal. Contact may cause allergic (contact) dermatitis (sometimes known as 'nickel itch'). This is characterised by a burning sensation, reddening of the skin, itching and superficial ulceration of the affected area. If this reaction or condition should develop, medical attention should be immediately sought. Individuals may also develop sensitivity to contact with nickel over a period of time. Once sensitisation has occurred it can persist indefinitely. If this should occur immediately cease the direct handling nickel or nickel containing materials and avoid any further contact.
Eye Contact	Temporary irritation/discomfort – metal particles could cause minor scratching of eye surface
Inhalation	May cause dizziness, drowsiness, confusion, headaches, nausea – risk of unconsciousness at high exposure levels
Note For Persons Wearing Contact Lenses	If skin contact has occurred, traces of silicone resin may remain on the skin for several days, even after thorough washing. Contact lenses should be removed *before* working with this product. The lenses should not be handled again until all traces of silicone resin have been removed from the hands, as the silicone resin could transfer to the contact lenses and cause severe eye irritation

12. Ecological Information

- No data is available at this time

13. Disposal Considerations

- Waste material should be disposed of in accordance with local, national and community regulations
- Accumulated *cured* waste material may be sent to an appropriate refinery for metal recovery

14. Transport Information

This product is classified as a non-flammable solid for the purpose of transportation.
This means that AS-NCS001 is not considered hazardous for transport and therefore there are no special packaging requirements and no restrictions apply to transportation by any method

15. Regulatory Information

In Great Britain reference should be made to the requirements of the *Control of Substances Hazardous to Health Regulations (COSHH),* the *Management of Health and Safety at Work Regulations,* and the occupational exposure limits detailed in the current edition of *EH40.* Other legislation may also apply. Elsewhere, local, national and community regulations may apply

Nickel metal is classified as a category 3 carcinogen by the EU in directive 67/548/EEC (possible carcinogenic effect but insufficient evidence to make a satisfactory assessment). Note nickel encapsulated in this material

The chemical Hazard Information and Packaging for Supply Regulations (CHIP 3) require that nickel metal be labelled with the following risk and safety phrases

Xn – Harmful – category 3 carcinogen

R40 - Limited evidence of a carcinogenic effect
R43 - May cause sensitization by skin contact
S36 – Wear suitable protective clothing

16. Other Information

This data sheet is a compilation of information obtained from the data sheets supplied by the manufacturers of the materials present in this product. This compilation of data is believed to be reliable, but it is supplied without warranty of any kind and P&P Technology Ltd assumes no obligation or liability for its completeness or accuracy. The information may not be valid if the product is mixed with other materials prior to use. The information contained in this data sheet does not constitute the user's own assessment of workplace risk as required by health and safety legislation.