Silver Conductive Adhesive

P & P Technology MS-S-007 is a single component electrically conductive adhesive comprising of silicone resin filled with conductive silver particles.

It is a single ready to use adhesive which cures on exposure to air at room temperature to form an electrically conductive flexible silicone elastomer. Once cured it adheres strongly to a wide range substrates.

Main features

- Neutral cure – does not evolve corrosive by-products on curing
- Safe for use with most common substrates – non tarnishing / discolouring
- Excellent resistance to ageing
- Wide service temperature range – remains flexible and conductive at extremes of temperature
- Stable - low bond (joint) resistance through temperature cycling
- High bulk conductivity

Applications

- Vibration and/or shock resistant sealant/adhesive for electronic assemblies
- Electrical connection/bonding of materials with dissimilar thermal expansion coefficients i.e. mounting shielded windows
- EMI shielding with environmental sealing (IP68 possible)
- ESD control/grounding

Uncured Properties	
Colour	Grey
Form	Semi-flowable paste
Cure time – 10mm bond width at 23°C/50% RH	24 hours
Recommended minimum time before stressing bond	48 hours

Cured Properties	
Density	3.2 gcm^{-3}
Hardness	65 Shore A
Adhesion – lap shear (aluminium to aluminium)	200 Ncm^{-2}
Service temperature range	-60°C to 200°C
Bond resistance (aluminium to aluminium)	<10mΩ cm^{-2}
Thermal conductivity	5.5 $Wm^{-1}K^{-1}$
Recommended bond thickness	0.05 – 0.5mm

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Packaging

MS-S-007 can be supplied in either standard manual or pneumatic (air dispense) 10ml syringe barrels from which the material may be directly applied. Both formats will accept a variety of dispense tips (including luer lock types) for accurate, controlled application.

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 16 weeks.

Instructions for Use

Surfaces should be clean dry and sound i.e. free form loose material. It is recommended that areas to be bonded are cleaned using a suitable solvent prior to applying the sealant

To ensure the highest level of electrical or shielding performance it is essential that the surfaces to be bonded have a low contact resistance. This means than materials that have a naturally occurring oxide layer such as aluminium alloys may need to be lightly abraded and cleaned directly prior to bonding.

Assemble parts as soon as possible and certainly within 5 minutes of adhesive application

Material cures from the outer exposed surface inwards, therefore avoid bond widths greater than 12mm

In most cases parts may be handled after 24 hours but avoid stressing the joint until full cure has been achieved

The time for full cure to take place is dependent on both humidity and temperature. Higher levels of temperature and humidity will minimise curing times whilst low levels of humidity and temperature will retard curing.
Generally, cure rate may be most conveniently controlled by means of temperature

Excess material should be removed by means of a spatula or similar implement. Smaller traces of the uncured material may be removed by wiping with a lint free cloth damped with MEK, petroleum spirit etc. taking care to observe the safety precautions required in using flammable/harmful solvents of this type

A priming agent is available for treating some inconsistent or difficult to bond surfaces. Please contact us for further information

This product is not intended for direct use in food, medical and cosmetic applications.

To the best our knowledge the information contained in this data sheet is accurate and representative of the product, however, it is the responsibility of the user to determine the suitability, safety and legality of use in any application

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Material Safety Data – Issue 2 July 2016

The data contained in this data sheet is applicable to the **uncured** material only

1. Identification of the substance/mixture and of the company/undertaking

1.1 Trade Name MS-S-007 CONDUCTIVE ADHESIVE COMPOUND

1.2 Description Viscous single component silicone material filled with electrically conductive silver particles

1.3 Formula Mixture

COMPANY

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2 Hazards Identification - Potential Health Effects

2.1 Ingestion	Low order of toxicity
2.2 Skin Contact	Prolonged contact may result in skin irritation
2.3 Eye Contact	Causes eye irritation – see note below concerning contact lenses
2.4 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/information on ingredients -

Chemical Name	CAS-No.	EC EINECS No.	Symbol	%(W/W)	R-phrase
Silver (Ag)	7440-22-4	231-955-3	-	<25	-
Trimethoxyvinyl silane	2768-02-7	220-449-8	X_n	<1	R10, R20
Triethoxy(methyl) silane	1185-55-3	214-685-0	X_n	<1	R22
Methanol	67-56-1	200-659-6	T	<0.1	R23, R24, R25 R39

Chip Classification risk (R) phrases

R10	Flammable
R20	Harmful by inhalation
R22	Harmful if swallowed
R23	Toxic by inhalation
R24	Toxic in contact with skin
R25	Toxic if swallowed
R39	Danger of very serious irreversible effects

4 First-Aid Measures

Obtain medical attention in severe cases or if symptoms persist

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

5 Fire-Fighting Measures

5.1 Extinguishing Media	Carbon dioxide (CO_2), dry chemical or foam
5.2 Special Fire-Fighting Procedures	Wear positive pressure, self-contained breathing apparatus and protective clothing. Combustion of this product & its packaging will generate toxic fumes
5.3 Hazardous Combustion Products	Carbon dioxide (CO_2) Carbon monoxide (CO) Silica (SiO_2) Traces of incompletely burned or semi decomposed carbon compounds

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)

8.1 Engineering Controls	Exhaust ventilation Eye wash stations
8.2 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.
8.3 Protective Gloves	Light weight latex or nitrile if necessary
8.4 Eye & Face Protection	Safety glasses
8.5 Other Protective Equipment	Laboratory coat, apron or good quality disposable protective overalls
8.6 Ventilation	Use only in well-ventilated area – use mechanical ventilation if required

9 Physical & Chemical Properties

Appearance	Silver fluid
Odour	Solvent / characteristic oxime
pH	Not applicable
Boiling point	>65^{o}C
Melting point	Not applicable
Flash point	>100^{o}C
Flammability	Not determined
Auto flammability	Not applicable
Explosive properties	Not applicable
Density	2.4 gcm^{-3}
Viscosity	50000 cP (paste)
Solubility in water	Insoluble – immiscible with water

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^{o}C

Incompatibility (Materials to Avoid):

- Acidic agents
- Basic agents(Bases/alkalis)
- Oxidizing agents
- Amines
- Ammonia gas or ammonia containing solutions
- Contact with water will initiate curing process

11 Toxilogical Information

11.1 Ingestion	Reacts with moisture to form methanol – risk of serious effects at doses above 200mg/kg
11.2 Skin Contact	Low risk of adverse effects
11.3 Eye Contact	Temporary irritation/discomfort – metal particles could cause minor scratching of eye surface
11.4 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
Silver	Chronic absorption or ingestion of silver metal may cause a condition known as ‘Agyria’. This is where the skin or other body tissues may take on a blue/grey discolouration due to the accumulation of fine silver particles. This may occur as a localised effect on the skin/hands where silver containing materials are frequently handled allowing silver particles to become embedded

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 ECA-SS001 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

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.

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