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Technical Data | May 2021

3M™ Electrically Conductive Double-Sided Tape 9711S Series

Product Description

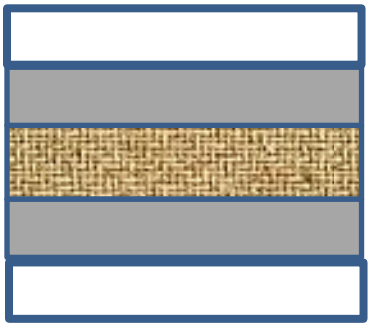
3M™ Electrically Conductive Double-Sided Tape 9711S Series are an XYZ electrically conductive pressure sensitive adhesive (PSA) tapes matrix. 3M tape 9711S series consists of a conductive matrix carrier (Nickel/copper-coated conductive fabric) and conductive PSA that is electrically conductive and is designed for PSA attachment to the desired grounding surfaces. The product is an acrylic based adhesive solution and offers adhesion and grounding performance to many surface types. 3M tape 9711S series provides electrical grounding performance with small size contacts and PSA attachment for EMI shielding designs.

Key Features

- XYZ-conductivity through the adhesive
- Conformability and quick bonding
- EMI shielding in bond line gap
- Thicker construction to conform to non-flat surfaces
- Electrical contact to small size areas
- Handling and workability
- Multiple thickness options available

Product Construction

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.



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Product Construction / Materials Descriptions

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3M™ Electrically Conductive Double-Sided Tape 9711S Series*	
Color	Face Side: Grey metallic Back Side: Grey metallic
Conductive Adhesive Type	Acrylic Conductive Adhesive
Release Liner**	Face Side: Transparent PET release liner Back Side: Transparent PET release liner

Note: *The product is available in 1050 mm x 100 meter. Contact your local 3M representative for more information.
** 3M tapes 9711S-250 and 9711S-300 utilize a single sided paper release liner on the back-side.

Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product.

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	Target Value												
Property	**9711S -30**	**9711S -50**	**9711S -80**	**9711S -100**	**9711S -120**	**9711S -130**	**9711S -140**	**9711S -150**	**9711S -200**	**9711S -210**	**9711S -250**	**9711S - 300**	**Test Method**
Thickness	30 µm	50 µm	80 µm	100 µm	120 µm	130 µm	140 µm	150 µm	200 µm	210 µm	250 µm	300 µm	ASTM D1000[a]
Adhesion to SUS Face Side (gf/inch)	1300	1500	1500	1800	1800	1800	1800	1800	1500	1500	1300	1300	ASTM D1000[a]
Adhesion to SUS Back Side (gf/inch)	1300	1500	1500	1800	1800	1800	1800	1800	1500	1500	1300	1300	ASTM D1000[a]
Electrical Resistance through XYZ-Axis		0.2 Ω on the both sides											3M ETM-7[b]
Electrical Resistance through Z-Axis		0.05 ~ 0.1 Ω											3M ETM-12[b]

[a] Tested in accordance with ASTM D1000 test method.
[b] 3M test method notes attached.

Shielding Effectiveness

Many factors determine the shielding effectiveness of a conductive adhesive tape, including type and thickness of the conductive layers, adhesive strength, degree of contact, smoothness of application surface, test frequency, etc. For 3M tape 9711S series, the typical shielding effectiveness is expected to be in the range of 40 dB to 60 dB, using a standard EMI shielding test methods and through the thickness of the sample tested.

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Typical Operating Temperature Range for Acrylic-Based Pressure Sensitive Adhesives (PSAs)

3M acrylic conductive pressure sensitive adhesives (CPSAs) contain conductive fillers. The grounding and/or substrate interconnection performance of the conductive fillers within the acrylic PSA in an application will vary based on many factors including substrate types, contact grounding area, surface geometry in the bond line, flexibility of substrates, bonding conditions, applied voltage/current, application environment and environmental aging conditions-exposure.

In general, the acrylic PSA polymer itself used in acrylic CPSAs have good short term and long term environmental stability with respect to the PSAs macro-adhesion performance to many substrates. The acrylic polymers typical long term (days-weeks) performance and short-term performance (minutes-hours) based on an adhesion test method is generally 85°C (185°F) long term and 121°C (250°F) short term.

3M CPSAs should be tested in the desired application to ensure the product is appropriate for use based on the application's specific requirements, including substrate types, contact grounding area, surface geometry in the bond line, flexibility of substrates, bonding conditions, applied voltage/current, application environment and environmental aging conditions-exposure.

Applications

3M™ Electrically Conductive Double-Sided Tape 9711S Series is typically used for applications requiring excellent electrical conductivity from the application substrate through the adhesive to a second substrate. Common uses include grounding and EMI shielding in equipment, components.

Application Techniques

Note: Carefully read and follow the manufacturer's precautions and directions for use when working with solvents. Tape application below 10°C (50°F) is not suggested. Once properly applied, low temperature holding power is generally satisfactory.

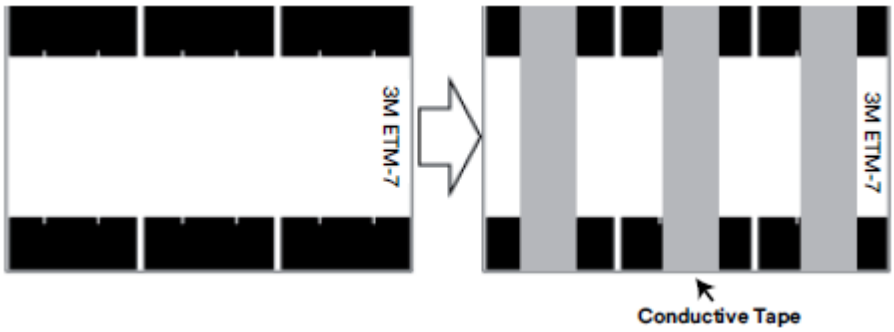
The bond strength of 3M™ Electrically Conductive Double-Sided Tape 9711S Series depends on the amount of adhesive-to-surface contact developed during application and substrate type and surface conditions.

1) Firm application pressure helps develop better wet-out and adhesive contact and may lead to improved bond strength as well as electrical conductivity. Pressure must be applied to the bond area after assembly to ensure sufficient wet-out of the 3M tape 9711S series adhesive to the substrates and to engage the conductive acrylic adhesive fillers with the substrates to make electrical connection. Mechanical pressure (roller, metal bar) or finger pressure at 5-15 psi. (Optimally the application conditions are determined via a set of Design of Experiments (DOE) using a range of application pressures, dwell time and temperatures (suggested initial range might include 5-15 psi, 2-5 seconds, 21°C-38°C).
2) Heat may be applied simultaneously with pressure to improve wetting, final bond strength and electrical conductivity. Suggested temperature range to evaluate is in the 38°C-60°C range.
3) To obtain optimum adhesion, the bonding surfaces must be clean, dry and well unified. Some typical surface cleaning solvents are isopropyl alcohol or heptane.

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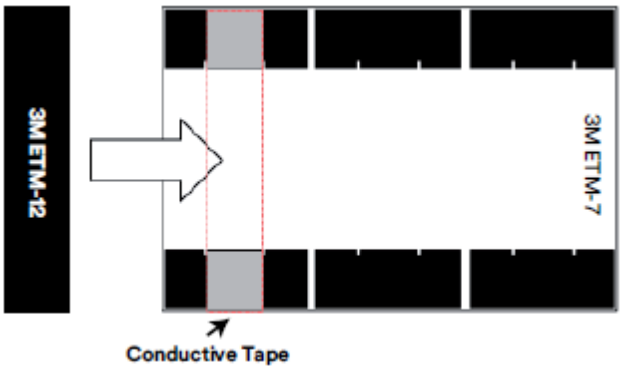
3M ETM-7: XY-Axis Electrical Resistance through Adhesive

Place a strip of the single (double) side conductive tape in 10 mm x 40 mm with adhesive side down between the electrodes on 3M ETM-7 testing board. After initial hand lamination to provide for a 10 mm x 10 mm contact area between the tape and electrodes, apply a 2kg rubber roller across the tape one time. Application method simulates a typical manufacturing process that might be used to apply the tapes to a surface. After 20 minutes of dwell time, the DC resistance between the electrodes are measured with a micro-ohm meter. The resistance results are recorded after 5 ~ 30 seconds for initial resistance.



3M ETM-12: Z-Axis Electrical Resistance through Adhesive

Place conductive tape pieces in 10 mm x 10 mm on the center of the electrodes on 3M ETM-7 testing board. Then place 3M ETM-12 testing board with the gold-plated side down on the tapes between electrodes. After initial hand lamination to provide for a 10 mm x 10 mm contact area between the tapes and electrodes, apply 2kg rubber roller across the tape one time. Application method simulates a typical manufacturing process that might be used to apply the tapes to a surface. After 20 minutes of dwell time, the DC resistance between the electrodes are measured with a micro-ohm meter. The resistance results are recorded after 5 ~ 30 seconds for initial resistance.



Storage and Shelf Life

The shelf life of 3M™ Electrically Conductive Double-Sided Tape 9711S Series is 12 months from the date of manufacture when stored in roll form, in the original packaging materials, and stored at 21°C (70°F) and 50% relative humidity.

3M™ Electrically Conductive Double-Sided Tape 9711S Series

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is commercially available from 3M. The commercially available product will have a COA specification established. The COA contains the 3M specifications and test methods for the products performance limits that the product will be supplied against. The 3M product is supplied to 3M COA test specifications and the COA test methods. Contact your local 3M representative for this product's COA.

Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product.

Safety Data Sheet: Consult Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

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