## Tape Solutions for Protection Thermal Spray

### Industry Standard Test:

**ASTM D1000**

### Importance:

20 minutes.

### What is it:

Measure of adhesion strength to itself after the bond strength to itself needs to match the bond stick to itself. Often the layers are typically used for masking, so tape must stick to itself. Often the tape is spirally wrapped so the bond strength to itself needs to match the bond strength to the part.

**Industry Standard Test:** ASTM D1000

### CONFORMABILITY

**What is it:** How well the tape adheres to complex shapes without leaving uncovered areas. Some elongation will help with conformability.

- **= Excellent**
- **= Good**
- **= Poor**

**Importance:** The part must be completely masked to avoid the thermal spray coating from applying in areas where the coating is not needed. If areas that are not supposed to have coating are coated, post-process removal or re-spraying may be required.

### BACKING ADHESION

**What is it:** Measure of adhesion strength to itself after 20 minutes.

**Importance:** Multiple layers are typically used for masking, so tape must stick to itself. Often the tape is spirally wrapped so the bond strength to itself needs to match the bond strength to the part.

**Industry Standard Test:** ASTM D1000

### TEAR STRENGTH

**What is it:** The ability of a tape to resist tear when a nick is made in the edge. Many plastic films will easily tear with very low force once a nick is made in the edge. To avoid this, a scrim or other fiberglass reinforcement is used to increase the tear resistance. When a nick is made in a reinforced tape with high tear strength, the tear will not propagate across the film.

- **= Excellent**
- **= Good**
- **= Poor**

**Importance:** If a tape has low tear strength, when it is removed it will come apart in small pieces and significantly increase the amount of time to remove the tape. Labor cost to remove the tape is expensive and requires unnecessary time on post-process rework.

**Industry Standard Test:** ASTM D624 “Trouser Test”

### TENSILE STRENGTH

**What is it:** Measure of the force required to break a tape. A tape with high tensile strength is a stronger tape.

**Importance:** A tape with a high tensile strength is easier to remove after spraying; allows the user to pull with some force to push out any gaps or bubbles.

**Industry Standard Test:** ASTM D1000

### THICKNESS

**What is it:** Higher total thickness = higher thermal insulation & increased ability to survive multiple passes of thermal spray coatings. Each pass of a thermal spray coating may wear away a thin layer of the masking tape. Multiple layers of a tape or a thicker tape may be applied to survive the spraying process without burn-through.

**Importance:** A tape that is too thin will burn-through. Tape must be thicker than the coating that is being applied in order to avoid bridging.

**Industry Standard Test:** ASTM D1000

### ABRASION RESISTANCE

**What is it:** An indicator of how well a tape has survived multiple thermal spray coating passes. The thermal spray gun can spray 20 layers or more in separate coating passes.

- ** = Excellent**
- ** = Good**
- ** = Poor**

**Importance:** The spray velocity ranges from 200–400 meters per second in plasma coating. If the masking tape is not abrasion resistant, the coating will wear a hole in the masking tape.

### DEFLECTION

**What is it:** Thermal spray coatings will bounce off of some masking tapes. This is called deflection.

- ** = Excellent**
- ** = Good**
- ** = Poor**

**Importance:** Coatings that are deflected will coat areas of the part that are not intended to be sprayed. Deflection causes rework of the part because the excess coating must be cleaned.

### BRIDGING

**What is it:** If the coating sticks to the masking tape, bridging will occur. Bridging is when the coating coats both the masking tape and the part forming a “bridge.” The thermal spray coating should not stick to the masking tape.

- ** = Excellent**
- ** = Good**
- ** = Poor**

**Importance:** When the tape is removed from a bridged coating, the coating will break in an uneven edge that will need to be reworked in order to get a smooth line. The jagged coating line that is caused by bridging is undesirable.

### ADHESION TO PART

**What is it:** Measure of adhesion strength to stainless steel after 20 minutes.

**Importance:** The masking tape needs to stick to the part and remain stuck even when exposed to very high velocity coatings typically 300–400 m/s. Some coating velocity can be as high as 900 m/s.

**Industry Standard Test:** ASTM D1000

### ADHESIVE RESIDUE

**What is it:** Test for 1 hour at 500°F (260°C). Rate adhesive residue % on a stainless steel panel.

- ** = Excellent**
- ** = Good**
- ** = Poor**

**Importance:** Residue left on parts must be cleaned. The labor to clean parts unnecessarily is expensive for thermal spray companies.

**Industry Standard Test:** Tapes are applied to a stainless steel panel and raised to 500°F (260°C) for 1 hour. The tape is allowed to cool to room temperature and % residue is rated after the tape is removed.

### TEMPERATURE

**What is it:** Short and long-term temperature exposure requirements.

**Importance:** Tapes will be exposed to a flame that is sometimes hotter than 1832°F (1000°C). The substrate must protect the adhesive from this temperature without burning. The adhesive can withstand 600°F (315°C) for short duration.

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- **CONFORMABILITY**: How well will the tape adhere to a substrate without causing wrinkles, and is the bond still intact after high temperature exposure? 
  - Excellent 
  - Good 
  - Fair

- **TEAR STRENGTH**: The ability of a tape to resist tearing when a nick is made in the edge. 
  - Excellent 
  - Good 
  - Fair

- **TENSILE STRENGTH**: Measure of the force required to break a tape. 
  - 100 lbs/in (14 kg/cm) 
  - 100 lbs/in (14 kg/cm)

- **THICKNESS**: Higher total thickness = higher insulation & increased ability to survive the spraying process without burn-through. 
  - Excellent 
  - Good 
  - Fair

- **ABRASION RESISTANCE**: Thermal spray coatings will bounce off reinforced tapes but not a thinner tape. 
  - Excellent 
  - Good 
  - Fair

- **DEFLECTION**: The thermal spray coating will bounce off reinforced tapes but not a thinner tape. 
  - Excellent 
  - Good 
  - Fair

- **BRIDGING**: The coating coats both the masking tape and the part forming a “bridge.” The thermal spray coating should not stick to the masking tape. 
  - Excellent 
  - Good 
  - Fair

- **ADHESION TO PART**: Measure of adhesion strength to stainless steel after 20 minutes. 
  - 15 mils (0.38 mm) 
  - 20 mils (0.51 mm)

- **ADHESIVE RESIDUE**: For improved impact resistance and holding power. 
  - Excellent 
  - Good 
  - Fair

- **Value Plasma Tape options**: adhesive on one side

- **Value Masking Tape options**: adhesive on one side

**Legend**: 
- PDPS90: 11 mils (0.28 mm) 
- HV60: 15 mils (0.38 mm) 
- H7575: 20 mils (0.51 mm) 
- H7525: 22 mils (0.56 mm) 
- H6595: 21 mils (0.53 mm) 
- 2925: 20 mils (0.51 mm) 
- 2926: 18 mils (0.46 mm) 
- 6005: 21 mils (0.53 mm) 
- 26020: 7 mils (0.18 mm) 
- 2005: 7 mils (0.18 mm) 
- 2925: 7 mils (0.18 mm) 
- 2926: 8 mils (0.20 mm) 
- 6005: 8 mils (0.20 mm)

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