SELECTING THE RIGHT ADHESIVE

In selecting the correct adhesive for a given application, it should first be acknowledged that there is no one adhesive that works every time on every material in all environments. Also, final adhesive characteristics may have to be compromised to meet application requirements. As examples, cure speed may be compromised for ultimate strength, or chemical resistance may be sacrificed for flexibility and so on.

The types of available adhesives and chemistries probably number in the hundreds, and possible requirement combinations are limitless. Listed here are key criteria to consider in selecting the adhesive. Only after specifying the criteria, can a match-up with an appropriate adhesive type be made.

- **MATERIAL TO BE BONDED:**
  - Similar or dissimilar
  - Porous or not
  - Rigid or flexible
  - Maximum gaps to fill, etc.

- **SURFACE CONDITIONS:**
  - Finish
  - Cleanliness
  - Compatibility with adhesive
  - Coatings
  - Surface irregularities

- **ENVIRONMENT:**
  - Temperature range
  - Fluids present
  - Temperature cycles
  - Pressure levels
  - Vibration and shock levels

- **ADHESIVE CURE REQUIREMENTS:**
  - Working time
  - Fixture (handling strength) time
  - Full cure time

As with adhesives, there are many different types of sealants available, each with its own set of strengths and weaknesses. To make the proper choice for a given application, define the following parameters and compare to specific sealant capabilities.

- **SURFACES TO BE SEALED:**
  - Compatibility with sealant
  - Porosity level
  - Cleanliness

- **CURING CATALYSTS:**
  - Heat
  - Mixing
  - Humidity
  - Absence of air
  - Primer, etc.

- **APPLICATION REQUIREMENTS:**
  - Spot or blanket coverage
  - Maintenance or production use
  - Manual or automatic dispensing

- **STRENGTH REQUIREMENTS:**
  - Short term
  - Long term
  - Disassembly concerns

- **CURING CATALYSTS:**
  - Heat
  - Mixing
  - Humidity
  - Absence of air
  - Primer, etc.

- **TYPES OF STRESS THE BOND EXPERIENCES:**
  - very important as some adhesives are excellent under one type, but poor under another.

SELECTING THE RIGHT SEALANT

- **SEALANT CURING TIME & WORKING TIME**
  - **APPLICATION REQUIREMENTS:**
    - Manual or automatic
    - Strip, spot or blanket coverage
    - Spray, dip, brush or caulk

- **ENVIRONMENT:**
  - Temperature range
  - Fluids present
  - Temperature cycles
  - Pressure levels
  - Vibration and shock levels
  - Inside or out

  - **MAXIMUM GAPS TO BE FILLED**
  - **FLEXIBILITY REQUIREMENTS**
  - **INSIDE OR OUT**
<table>
<thead>
<tr>
<th>TYPE</th>
<th>ACRYLIC SEALANT</th>
<th>BUTYL SEALANT</th>
<th>SILICONE SEALANT / ADHESIVE</th>
<th>URETHANE SEALANT / ADHESIVE</th>
<th>PANEL ADHESIVE</th>
<th>LUMBER ADHESIVE</th>
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</thead>
<tbody>
<tr>
<td>TYPE OF CURE</td>
<td>AIR</td>
<td>AIR</td>
<td>ACETOXY</td>
<td>MOISTURE</td>
<td>AIR</td>
<td>AIR</td>
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<tr>
<td>APPLICATION RANGE</td>
<td>45-115°F</td>
<td>40°-100°F</td>
<td>40°-100°F</td>
<td>40° TO 100°F</td>
<td>0°-120°F</td>
<td>0°-120°F</td>
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<td>SERVICE TEMP. RANGE</td>
<td>-20° ± 65°F</td>
<td>-20° + 180°F</td>
<td>-50° ± 400°F</td>
<td>-40° ± 180°F</td>
<td>0°-120°F</td>
<td>-10°±120°F</td>
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<tr>
<td>SKIN TIME</td>
<td>20-40 MINUTES</td>
<td>2 HOURS</td>
<td>5-15 MINUTES</td>
<td>8-24 HOURS</td>
<td>30 MINUTES</td>
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<td>FINAL CURE TIME</td>
<td>5 DAYS</td>
<td>10 DAYS</td>
<td>30 DAYS</td>
<td>7-30 DAYS</td>
<td>10 DAYS</td>
<td>20-30 DAYS</td>
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<td>ELONGATION</td>
<td>UP TO 200%</td>
<td>UP TO 150%</td>
<td>400%</td>
<td>1000%</td>
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<td>-</td>
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<tr>
<td>TENSILE STRENGTH</td>
<td>UP TO 20 PSI</td>
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<td>UP TO 300 PSI</td>
<td>UP TO 400 PSI</td>
<td>UP TO 29 PSI</td>
<td>UP TO 37 PSI</td>
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<tr>
<td>PEEL STRENGTH</td>
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<td>UP TO 40 PSI</td>
<td>20-50 PSI</td>
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<td>-</td>
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<td>COST INDEX</td>
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<td>LOW</td>
<td>HIGH</td>
<td>MODERATE</td>
<td>LOW</td>
<td>LOW</td>
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<tr>
<td>LIFE EXPECTANCY</td>
<td>90-50 YRS INDOORS</td>
<td>10 YEARS</td>
<td>20 YEARS</td>
<td>20 YEARS</td>
<td>30-50 YRS INDOORS</td>
<td>APP. 20 YEARS</td>
</tr>
</tbody>
</table>

**PRO**
- Bonds to almost any surface. Accepts paint readily.
- Extremely durable and flexible in all weather conditions.
- Extraordinary adhesion and flexibility in all weather conditions.
- Water resistant.
- Excellent for polystyrene foam, Ceramic, Tile, Wallboard, Cork
- Water resistant
- Can be used on wet pressure treated lumber.
- Bonds to almost any surface.
- Do not use outdoors when rain is imminent.

**CON**
- Recommended where temperature will fall below freezing for extended periods of time. Do not use outdoors when rain is imminent.
- Do not apply paint until it is fully cured.
- Not for use below grade or continuous water immersion. Does not readily accept paint.
- Not for use in submerged joints or horizontal traffic-bearing deck joints
- Do not use outdoors
- Do not use on polystyrene

**SPECS**
- ASTM C834-76
- TT-S-00-1657-Type I
- TT-S-00-1543
- TT-S-0023C
- ASTM C920-79
- Type S, Grade NS, Class 25, Use T,G,A and D,
- Exceeds MIL-A-46106A Type I
- FDA No. 21 USDA Rating P1
- TT-S-C023C, Type II
- ASTM C-920, Type S, Grade NS, Class 25, Use NT, Mand A.
- USDA Approved

**TYPE OF CURE** - The manner in which the material cures. AIR by solvent or moisture loss. ACETOXY - loss of acetic acid. MOISTURE - by absorbing moisture in the air to complete the chemical reaction.

**APPLICATION RANGE** - The temperature at which the sealant or adhesive may be applied.

**SERVICE TEMPERATURE RANGE** - The temperature at which the sealant or adhesive will perform it's purpose without failure.

**SKIN TIME** - The time it takes for the material to be dry to the touch.

**FINAL CURE TIME** - Total amount time necessary to fully cure and develop full performance characteristics.

**ELONGATION** - The percentage of movement by volume that the material will stretch and return to it's original size.

**TENSILE STRENGTH** - The force necessary to fail the material in tension.

**PEEL STRENGTH** - The force necessary to remove the material from that which it is adhering to.

**LIFE EXPECTANCY** - The expected usable life under the normal conditions for which the product was designed. Not ideal conditions.

**SPECS** - As there are many quality levels for each type the better the product the more likely it will meet ASTM specifications and can be considered architectural quality.