



# ADHESIVE PRODUCT TABLE

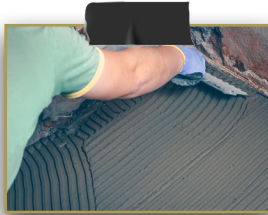
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## ENTECH POLYMERS OFFERS A VARIETY OF DIFFERENT POLYMERS FOR USE IN ADHESIVE FORMULATIONS

Carpet-Tape Adhesives



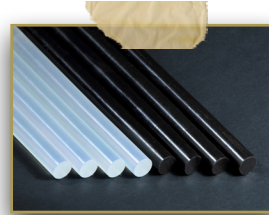
Structural Adhesives



Glass Adhesives



Glue Sticks



Pressure Sensitive Adhesives



Specialty Adhesive Applications



These polymers are commonly used in hot melt adhesives. These polymers may be used as a main polymer portion of the adhesive or as a modifier in the adhesive formulation.

Hot melt adhesives are often based on EVA or ethylene acrylate copolymers but can also utilize polyolefin elastomers (POE, PBE and OBC) for specialized applications.

PB-1 based hot melt adhesives are used in woodworking, mattress assembly and non-woven hygiene applications as well as packaging where they provide high flow, good wetting, excellent thermal stability and flexibility. PB-1 is also used as a modifier in hot melt adhesives where it can increase the cohesive strength and extend the open-time.

Ethylene acrylic acid copolymer based adhesives are commonly used for bonding glass, leather, textiles and metals.

Olefin block copolymers (OBC) can be used to replace SIS / SBS in pressure sensitive adhesive applications.

TPUs are also used in adhesives. However, they are typically either dissolved in a solvent or applied as a film or via an extrusion process. Lubrizol Pearlstick™ TPU is for solvent based adhesives. Common solvents used include acetone, MEK, THF, toluene, xylene, ethyl acetate and cyclohexanone. Pearlstick™ products are polycaprolactone and polyester based TPUs with a hardness range of Shore A 89 to A 93.

Lubrizol Pearlcoat™ are a range of special linear TPUs used in the melt coating process on textile substrates obtained by extrusion, calendaring and PVC compounding. Their hardness ranges from Shore A 70 to A 94.

Lubrizol Pearlbond™ products are based on polyester, polyether and polycaprolactone TPUs and can be amorphous or semi-crystalline. They have activation temperatures of  $\leq 110^{\circ}\text{C}$ ,  $\leq 100^{\circ}\text{C}$  or  $\leq 80^{\circ}\text{C}$  are available in a hardness range from Shore A 55 to D54 and are most commonly utilized as adhesive films.

| POLYMER TYPE | PRODUCER | TRADE NAME  | GRADE  | PERCENT COMONOMER | MELT FLOW RATE |
|--------------|----------|-------------|--------|-------------------|----------------|
| EVA          | Celanese | ATEVA®      | 1850A  | 18                | 150            |
| EVA          | Celanese | ATEVA®      | 1880A  | 18                | 500            |
| EVA          | Celanese | ATEVA®      | 2830A  | 28                | 150            |
| EVA          | Celanese | ATEVA®      | 2842A  | 28                | 400            |
| EVA          | Celanese | ATEVA®      | 2842AC | 28                | 400            |
| EVA          | Celanese | ATEVA®      | 2850A  | 28                | 850            |
| EVA          | Celanese | ATEVA®      | 4030A  | 40                | 55             |
| EVA          | Dow      | ELVAX™      | 420    | 18                | 150            |
| EVA          | Dow      | ELVAX™      | 410    | 18                | 500            |
| EVA          | Dow      | ELVAX™      | 4320   | 25                | 150            |
| EVA          | Dow      | ELVAX™      | 4310   | 25                | 500            |
| EVA          | Dow      | ELVAX™      | 220W   | 28                | 150            |
| EVA          | Dow      | ELVAX™      | 210W   | 28                | 400            |
| EVA          | Repsol   | PRIMEVA®    | P1550M | 15                | 5000 cP        |
| EVA          | Repsol   | PRIMEVA®    | P28025 | 28                | 25             |
| EVA          | Repsol   | PRIMEVA®    | P28150 | 28                | 150            |
| EVA          | Repsol   | PRIMEVA®    | P28800 | 28                | 800            |
| EVA          | Repsol   | PRIMEVA®    | P2850M | 28                | 5000 cP        |
| EVA          | Repsol   | PRIMEVA®    | P33400 | 33                | 400            |
| EVA          | Repsol   | PRIMEVA®    | P40055 | 40                | 55             |
| EMA          | Dow      | ELVALOY™ AC | 12024S | 24                | 20             |
| EMA          | Dow      | ELVALOY™ AC | 15024S | 24                | 50             |
| EEA          | Dow      | ELVALOY™ AC | 2103   | 19.5              | 21             |
| EBA          | Dow      | ELVALOY™ AC | 34035  | 35                | 40             |
| EBA          | Repsol   | EBANTIX®    | E27150 | 27                | 150            |
| EMAA         | Dow      | NUCREL™     | 599    | 10                | 450            |
| EMAA         | Dow      | NUCREL™     | 699    | 11                | 95             |
| EMAA         | Dow      | NUCREL™     | 925    | 15                | 25             |
| EMAA         | Dow      | NUCREL™     | 960    | 15                | 60             |

| POLYMER TYPE | PRODUCER | TRADE NAME     | GRADE    | DENSITY | MELT FLOW RATE   |
|--------------|----------|----------------|----------|---------|------------------|
| POE          | Dow      | AFFINITY™      | GA 1950  | 0.874   | 500 (estimated)  |
| POE          | Dow      | AFFINITY™      | GA 1900  | 0.870   | 1000 (estimated) |
| POE          | Dow      | AFFINITY™      | GA 1875  | 0.870   | 1250 (estimated) |
| POE          | Dow      | ENGAGE™        | 8137     | 0.864   | 13               |
| POE          | Dow      | ENGAGE™        | 7447     | 0.865   | 5                |
| POE          | Dow      | ENGAGE™        | 8200     | 0.870   | 5                |
| POE          | Dow      | ENGAGE™        | 8407     | 0.870   | 30               |
| PBE          | Dow      | VERSIFY™       | 4301     | 0.868   | 25               |
| PBE          | Dow      | VERSIFY™       | 4200     | 0.876   | 25               |
| OBC          | Dow      | INFUSE™        | 9807     | 0.868   | 15               |
| OBC          | Dow      | INFUSE™        | 9817     | 0.877   | 15               |
| OBC          | Dow      | INFUSE™        | 900      | 0.88    | 30               |
| PB-1         | Lyondell | <i>Koattro</i> | KTMR05   | 0.870   | 1.3              |
| PB-1         | Lyondell | <i>Koattro</i> | KTAR05   | 0.890   | 0.5              |
| PB-1         | Lyondell | <i>Koattro</i> | DP8911ME | 0.895   | 200              |
| PB-1         | Lyondell | <i>Koattro</i> | DP8510M  | 0.897   | 40               |
| PB-1         | Lyondell | <i>Koattro</i> | M1200M   | 0.908   | 1200             |
| PB-1         | Lyondell | <i>Koattro</i> | 0801M    | 0.915   | 200              |

| POLYMER TYPE | PRODUCER | TRADE NAME | GRADE   | DENSITY               | MELT FLOW RATE | PEAK MELTING TEMP (DSC), °C | GLASS TRANSITION (DSC), °C | CRYSTALLIZATION TIME (DSC), min. | MINIMUM ACTIVATION TEMP, °C |
|--------------|----------|------------|---------|-----------------------|----------------|-----------------------------|----------------------------|----------------------------------|-----------------------------|
| TPU          | Lubrizol | Pearlbond™ | 301     | Polyester             | 55             | 65                          | -30                        | >50                              | 90                          |
| TPU          | Lubrizol | Pearlbond™ | 302     | Polyester             | 55             | 75                          | -30                        | >50                              | 100                         |
| TPU          | Lubrizol | Pearlbond™ | 360     | Polyester             | 68             | 75                          | -49                        | >50                              | 110                         |
| TPU          | Lubrizol | Pearlbond™ | 700 EXP | Polyester             | 97             | 112                         | -23                        | 5                                | 110                         |
| TPU          | Lubrizol | Pearlbond™ | 702 EXP | Polyester             | 93             | 93                          | -30                        | 27                               | 100                         |
| TPU          | Lubrizol | Pearlbond™ | 960     | Polyether (aliphatic) | 69             | 72                          | -10                        | >50                              | 100                         |
| TPU          | Lubrizol | Pearlbond™ | 1160    | Polyester             | 90             | 49                          | -39                        | 37                               | 74                          |
| TPU          | Lubrizol | Pearlbond™ | 1160L   | Polyester             | 90             | 49                          | -39                        | 36                               | 65                          |