

# Dry Friction Product Specifications\*

## BRAKETEX<sup>®</sup> P-42

**Description** 100% KEVLAR<sup>®</sup> fiber composite material is a non-molded and non-asbestos, textile-reinforced polymer for industrial clutch and brake applications. Offers uniquely high wear resistance and low opposing surface wear. Available bonded to carrier plates in thicknesses as required (often laminated over a cork nitrile butyl substrate), or as a flexible laminate lining up to 10 mm (3/8") thick.

### Physical and mechanical properties

|                                  |   |
|----------------------------------|---|
| Composition                      | 100% long KEVLAR <sup>®</sup> fibers and proprietary polymer binders. Includes no metal, no abrasives, no cotton, and no fillers. |
| Density                          | 0.91 g/cu. cm (0.033 lb./cu.in.)  |
| Thermal conductivity             | Extremely low   |
| Shock resistance                 | Excellent (does not crack, or break)  |
| Lubricant contaminant resistance | Does not degrade  |
| Abrasiveness                     | Non-abrasive to opposing iron, steel, and copper surfaces such as rotors, drums and flywheels                                     |

### Operating conditions

|                  |  |
|------------------|--|
| Static pressure  | Up to 6900 kPa (1,000 p.s.i.), (or as limited by substrate)            |
| Dynamic pressure | 140 - 3100 kPa (20-450 p.s.i.)   |
| Temperature      | Ambient to 315° C (600° F)   |
| Surface speed    | Static to 40 m/s (8,000 ft./min.)                                      |
| Opposing surface | Machined and unfractured surface required, no fine finishing necessary |

Surface speed, temperature, and pressure are interdependent energy parameters. Values represent typical conditions and are not the ultimate limits of the material. Burnish time to achieve full mating surface contact can be three to five times longer than conventional friction materials.

### Approximate dry friction properties (after extended burnish)

|                                 |  |
|---------------------------------|--|
| Wear rate                       | 1/5 to 1/10 that of asbestos materials<br>1/2 to 1/3 that of sintered bronze materials   |
| Dynamic coefficient of friction | 0.36 $\mu$ $\pm$ 0.1 in the 95 - 345° C range (200° F - 650° F)<br>Approximately 25% higher than molded asbestos, glass - fibered, and graphitic materials |
| Static to dynamic ratio         | 1.05   |
| Fade                            | Significant fade at 260° C (500° F), accelerating at 370° C (700° F)   |

\*All values shown are approximations derived from a variety of tests and field applications. No warranty or implied liability assumed herein. Friction values shown are for guide purposes only, as actual values can deviate with individual design and operating conditions.

Patented. Developed and manufactured exclusively by:

(1/09) 1,000

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# Wet Friction Product Specifications\*

## BRAKETEX® P-42

**Description** 100% KEVLAR® fiber composite material is a non-molded and non-paper, textile-reinforced polymer containing no asbestos. Offers improved performance for all wet clutch and brake applications, featuring dramatically higher energy threshold to failure. Available bonded to carrier plates.

### Physical and mechanical properties

|                  |  |
|------------------|--|
| Composition      | 100% long KEVLAR® fibers and proprietary polymer binders feature higher temperature resistance than phenolics. Includes no metal, no abrasives, no cotton, and no fillers. |
| Density          | 0.88 g/cu. cm (0.032 lb./cu.in.)   |
| Shock resistance | Excellent (does not crack, chips, or break)  |
| Abrasiveness     | Non-abrasive to opposing surfaces  |
| Porosity         | Unique "open, continuous-pore" structure (Characteristic of proprietary textile-reinforced composite production process)   |

### Operating conditions

|                      |  |
|----------------------|--|
| Static pressure      | As limited by bond and carrier plate   |
| Dynamic pressure     | 140 - 2760 kPa (20-400 p.s.i.)<br>Upper limit not yet determined   |
| Oil Bath Temperature | Ambient to 150° C (300° F) in automatic transmission fluid<br>Ambient to 205° C (400° F) in silicone oil |
| Lubricant/Coolant    | No known limitations. Resists ethylene glycol.   |
| Opposing surface     | No fine finishing required, runs against steel, iron, stainless steel, copper, hard aluminum.            |

Surface speed, temperature, and pressure are interdependent energy parameters. Values represent typical conditions and are not the ultimate limits of the material. Burnish time to achieve full mating surface contact can be three to five times that of conventional materials.

### Approximate wet friction properties in automatic transmission fluid (after extended burnish)

|                                 |  |
|---------------------------------|--|
| Wear rate                       | 1/2 to 1/5 that of organics and paper,<br>1/2 to 1/3 that of sintered bronze materials   |
| Dynamic coefficient of friction | 0.10 to 0.15 $\mu$ in the 23 - 290 W/sq. cm range<br>(0.2 - 2.5 HP/sq. in.)<br>Approximately 10% higher than paper, maintaining coefficient beyond the energy limits of sintered bronze. |
| Static to dynamic ratio         | 1.05 - 1.15  |

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