SELECTION OF SPARTAN PADS FOR APPLICATION-SPECIFIC REQUIREMENTS

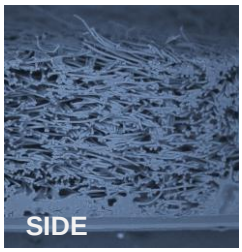
INTRODUCTION & SUMMARY:

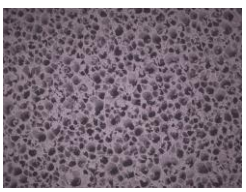
Much has been written about the polishing process especially the interface of pads, specific slurries and equipment for applications involving optics and semiconductor materials. My focus is on how various **Spartan Polishing Pads** can address applications-specific requirements. At **Spartan Felt Company** we manufacture synthetic materials that are best suited for industrial, optic, electro-optic, semiconductor, compound semiconductor and advanced materials surface preparation.

PROBLEM AND BASIC CONCERNS:

Engineers struggle to make the proper selection of a pad that best suits their unique need. To understand which type of pad is correct for their surface preparation need we must first identify the material's condition prior to the polishing step. Most times materials are exposed to a grinding and/or lapping step to bring the work piece to the proper thickness, global flatness, and basic finish to proceed on to the polishing steps and sequences.

After the proper pad is selected the problem presents itself as to how to properly condition the pad for initial use and maintain it to obtain the best lifetime for research and production needs.





Pads can be said to fall into three general applications:

1. Post Lap or Pre-Polish Pads – Generally a very hard pad comprised of polyurethane or plastic compositions. This type of pad can enhance the grinding or lapping step to remove any sub-surface damage and mechanical defects that are generated by the abrasive grains of the grinding wheel or free abrasive lapping step.

2. Stock Removal Pads – These pads are essentially polyester materials impregnated with various resins. The intent here is to refine the surface finish without the erosion of the global flatness while removing more bulk material.

3. Final Polish Pads – To obtain the best surface finish a pad made of Polycorfam (nylon, rayon, etc.) can be employed to produce low angstrom finishes.

Much depends on the kinetics of the polishing machine. While it is typical to employ a single-sided or double-sided polishing machine, custom developed or modified equipment will have an overall impact on the pad selection. Single-sided machines may usually use a plain pad with good wicking characteristics that allow the slurry to be uniformly dispensed over the entire active surface area. At times it may be necessary to select an embossed or perforated pad to enhance this result. The same is true for a double-sided machine, however, a pad with a crosshatch pattern may be needed to prevent the piece-parts from adhering to the upper platen at the end of the polishing cycle.

SOLUTIONS:

Let's have a look at an example in order to apply the above main points.

Sapphire, silicon carbide and hardened cover glass are materials of importance these days. Spartan's **AMG-5 Polishing Pads** are designed to address the Post Lap/Pre-Polishing circumstances. This fibrous non-woven material has excellent surface wear resistance, high liquid absorbing ability and good resistance to shear mechanical stresses. It has micro voids for improved slurry distribution. Here is the technical data for this unique pad:

4. Durometer: C Scale 55 +/- 5 (D Scale 36 +/- 5)
5. Compression: 1.5- 2.5% (1/2 lb. force displacement)
6. Density: .28-.32 g/cm3
7. Thickness: .050" (1.27mm)
8. Surface: Plain, XY Grooved, Spiral Grooved or Perforated)
9. Diameter: Up to 60"
10. Backings: PSA-SD-B (suggested) – High Temperature and Magnetic Backing available on request.

This pad requires a break-in period before initial use. Stainless steel conditioning rings with ceramic segments can be run on the polishing machine with little damage to the fibrous material. It is not suggested that diamond impregnated conditioning tools be used since this depletes the life of the pad. Such commercial pad conditioners are fine for the polyurethane/plastic compositions.

Following the stock removal step, a **Spartan Poretex Series Pad** should be used to improve the surface finish. This is a Polycorfam material with a specific pore structure to retain the chosen slurry and provide a "pumping" action to insure slurry distribution.

Stock removal rates and surface finish results depend on the slurry and machine characteristics.

Spartan would be pleased to accommodate your applications-specific requirements. We look forward to hearing about your need. Please feel free to visit our website at www.spartanfelt.com and tell us about your material type, diameter pad required and project requirements.

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