One Source for Precision Fibrous Parts

Spartan HP (High Performance) Media for Hard Metals

Mechanical polishing, in simple terms, involves bringing an abrasive to a surface to be polished under force; the carrier of the abrasive is a media. For centuries, wool has been the media of choice for polishing. Most commonly sheep's hair, wool has scales that can serve as an abrasive itself. Further, wool scales will entangle, and can be machined to form *felt*, a material that can be cut or shaped. Spartan Felt makes polishing pads, wheels, and rotary tools ("bobs"), from wool, while also providing technical expertise to end users, and has so for nearly 50 years. Despite the history of success with wool, there are specific short falls that are problematic with its use.

1. Wool is an insulator and will hold friction heat internally. In polishing applications, *wool must be kept cool*, or friction heat will build internally until it burns from inside out. Friction heat is kept low by reducing the force applied to wool tools and /or time that force is applied.
2. Wool typically does not perform well in applications involving cooling water, such as in CNC processes.
3. Wool is an animal-derived material, and per FDA's *non-binding* recommendations, only *Animal Derived Ingredient-free (ADI-free)* materials should be used in the manufacture of medical devices that are intended for use in contact with human body fluids. See *Medical Devices Containing Materials Derived from Animal Sources (Except for In Vitro Diagnostic Devices) 1 Guidance for Industry and Food and Drug Administration Staff; (https://www.fda.gov/media/87251/download)*. The intention being to reduce "the risk of transmitting infectious disease when [animal derived materials are] improperly collected, stored, or manufactured".

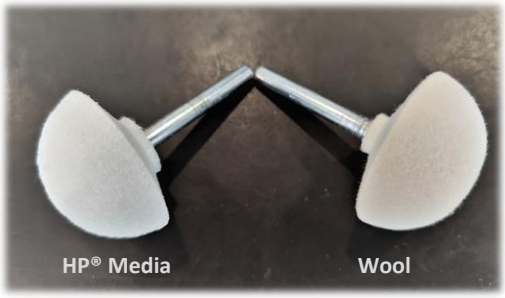
Spartan developed HP® media to improve polishing performance above the capabilities of wool and to meet the ADI-free recommendations of the FDA for our Medical Device manufacturing customers.

HP® media are patented blends of synthetic fiber and polyurethane binder, with a look and feel of dense wool felt. Spartan manufactures polishing tools such as wheels, pads, or bobs from HP® media, including impregnation with different water-based chemistries and abrasives to modify performance. Tools made from HP® media are highly customizable to solve challenging finishing applications by varying size, shape, hardness and abrasive. HP® media are also not affected by cooling water used in automated CNC processes.

Spartan HP45® media is formulated to be hard for tools that will keep their shape & stay cool under friction heat; it is being successfully used for polishing of medical devices.

HP45® Media Properties:

- ***High Heat Resistance***
- ***Low Heat Absorption (Non-Insulating)***
- ***Porous Structure to Assist in Cooling***
- ***Excellent for Abrasive Impregnation***
- ***Easily Shaped to Specific Profiles***
- ***Unnafected by Cooling Water***
- ***Contains No Hazardous Ingredients***
- ***Animal Derived Ingredient-Free***



Spartan Felt Company, Inc. (864) 576-7919 info@spartanfelt.com

The Benefit of High Heat Resistance and Non-Insulating Porosity:

To increase to efficiency of polishing, higher shearing force must be applied to the media carrying the abrasive to the surface. However, friction heat builds faster with increased force. Friction heat is held internally by wool, and eventually wool will burn from inside. HP® media is formulated to have higher resistance to friction heat. Further, HP® is porous, and does not hold heat internally. Cooling air can flow through HP® media, and heat is allowed to flow out. The higher heat resistance and better airflow through HP® allows application of higher force; this results in faster material removal from the surface.

The Benefit of Holding Shape and Fit:

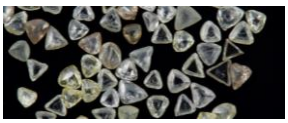
Tools made from HP45® can be shaped to fit a profile of a part being polished, i.e., a taper or a specific radius. Spartan has found that because of the heat resistance, the tool will hold its shape, enabling the part profile to be polished evenly without removing more material than necessary. HP® products have been shown to reduce rejects due to deformation or creating areas where too much material was removed to meet specification.

The Benefit of Water Resistance:

With the prevalence of water-cooled CNC cutting, and the desire for automation, water resistance of finishing tools is an important advantage. HP® is not degraded by water, enabling the use polishing tools in a wet process, such as CNC.

The Benefit of Abrasive Impregnation:

HP® media can be impregnated with abrasives, such as aluminum oxide, silicon carbide, or diamond. As the tool wears, new abrasive becomes available. Abrasive impregnation can eliminate the need for additional compound, and the mess it makes when slinging off the tool.



Diamond

Automation is simpler and cleaner with tools made with Spartan HP® media.

- Abrasive impregnation eliminates the need for abrasive compound and the mess it creates.
- High resistance to friction heat and unaffected by cooling water.
- Spartan tools are manufactured with lot-to-lot consistency; we are ISO certified with material traceability.

Sharing our experience:

Spartan Felt evaluates polishing applications in-house as a service to our customers. Our lab tests customers' parts to offer suggestions and recommend products, saving our customers development and trial time. We can offer HP® media -based tools that match or exceed wool-based tools.

If you would like to see how HP® media tools might improve your polishing applications, please contact us for additional information or samples.

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