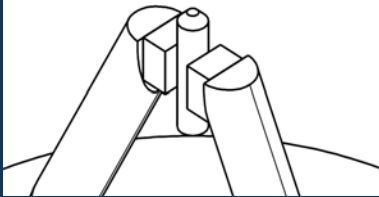
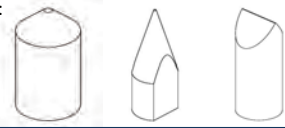
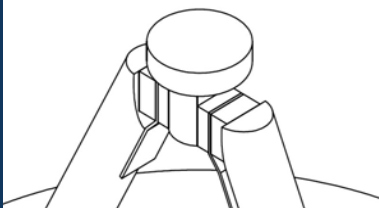
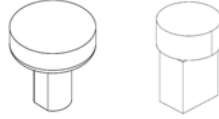
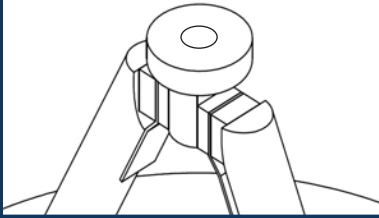
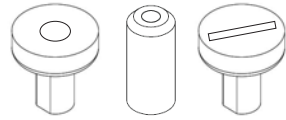
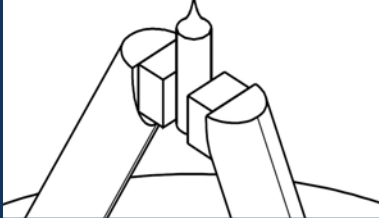



CATHODE CONFIGURATION GUIDE

Cathode Style	Source Material	Overview	Modification Abilities
Standard - Single Source Crystal 	CeBix LaB6 Hafnium Carbide	High Brightness Relatively Small Spot Size Extremely Robust Most Universally Used Style - Used by many OEMS Thermal Emitter (TE)	Increase/Decrease Truncation Size Increase/Decrease Length Custom Or Standard Base (See Application Guide) Examples: 
Top Hat - Large Emission Surface 	CeBix LaB6 Hafnium Carbide	Larger Emission Surface Greater Total Current Thermal Emitter (TE)	Increase/Decrease Surface Diameter Customize Surface Orientation Custom Or Standard Base (See Application Guide) Examples: 
Guard Ring - Embedded In Carbon 	LaB6 Hafnium Carbide Zirconium Carbide	Defined Emission Area No Edge Effect Shape Emission Surface Thermal Emitter (TE)	Customize Surface Orientation Customize Shape/Size Of Guard Ring Increase/Decrease Source Diameters Custom Or Standard Base (See Application Guide) Examples: 
Etched Tip - Point Source 	Hafnium Carbide Zirconium Carbide	Cold Field Emitter (CFE) - Outperformed W CFE in brightness energy distribution, and emission stability ¹ Extended Schottky Emitter (ESE) - 10x higher beam currents than ZrO/W(100) source operated in Philips XL40 SEM ²	Increase/Decrease Tip Radius Increase/Decrease Length Increase/Decrease Heat Power Customize Height and Geometry
Etched Tip - Point Source 	Tungsten Molybdenum	Cold Field Emitter (CFE) Rebuilding Services Available	Increase/Decrease Emitter Radius Customize Crystal Orientation (310)(100) Customize Height and Geometry
*Product chart displays general categories, but customers are not limited to these options as APtech accepts various customization requests. *Please consult with a specialist about your desired specifications and application.			
¹ K.J. Kagarice, G.G. Magera, S.D. Pollard, & W.A. Mackie, "Cold field emission from HfC(310)", J. Vac. Sci. Technol. B 26(2), Mar/Apr 2008. ² W.A. Mackie, J.M. Lovell, T.W. Curtis, & G.G. Magera, "HfC(310) high brightness sources for advanced imaging applications", J. Vac. Sci. Technol. B 32(2), Mar/Apr 2014			