What is the right material for a particular tool or application? Mechanical, thermal and electrical properties of a material have to be compatible with the process and requirements during the die attach assembly step. The choice of material is infinite. However, there are a few which have been established as base material for years and are known by engineers and recommended by most tool suppliers. SPT continuously investigates and makes trials with alternative materials and concepts. Please, consult SPT sales office or personnel for our wide range of available materials to fit your needs. Cost of less common plastics (*) may be higher than other standard plastics.

Available Materials Definition & Description

Color / Code	Name	Hardness	Resistivity Range	Max Temp	Available for Tool Type
○ AZ	Ceramic $Al_2O_3ZrO_2$	2000 HV10	Insulative	>500°C	AZ-CT
● AZB	Black Ceramic $Al_2O_3ZrO_2$	2000 HV10	Insulative	>500°C	AZB-CT, AZB-RT
● W	Tungsten carbide	1700 HV10	Conductive	500°C	Collets , PL, CT, RT
○ SS	Stainless Steel	160 HB30	Conductive	>500°C	Shanks , PL
● P01	PBI *	Rockwell E105	Insulative	310°C	Consult nearest SPT office
● TORS	Torlon ESD safe	Rockwell E90	Dissipative	270°C	CT, RT, 2151-CT, RPCT, PL
● TOR	Torlon Polyamide-imide (PAI)	Rockwell E86	Insulative	250°C	CT, RT, 2151-CT, RPCT, PL
● HTV	Vespel Polyimide (PI) SP01	Rockwell E52	Insulative	240°C	CT, RT, 2151-CT, RPCT, PL
● HTV21	Vespel Polyimide (PI) SP21	Rockwell E35	Dissipative	250°C	CT, RT, 2151-CT, RPCT, PL
● P03	PEI *	Rockwell M115	Dissipative	170°C	Consult nearest SPT office
● P02	PEEK *	Rockwell M95	Dissipative	250°C	Consult nearest SPT office
○ DEL	Delrin (POM)	Rockwell M92	Insulative	135°C	CT, RT, 2151-CT, RPCT, PL
● DELB	Delrin (POM) Black	Rockwell M92	Dissipative	135°C	RPCT
○ DELS	Delrin (POM) ESD safe	Rockwell M74	Dissipative	90°C	CT, RT, 2151-CT, RPCT, PL
● PES	Polyethersulfone *	Rockwell M87	Dissipative	170°C	Consult nearest SPT office
● P06	PTFE *	Rockwell M35	Conductive	260°C	Consult nearest SPT office
● NBR	Nitrile rubber (NBR)	88 Shore A	Dissipative	100°C	RTR, CTR, SC, RT, PL
○ 74AS	Thermoplastic elastomer	88 Shore A	Dissipative	135°C	PCTR / PRTR
● 74B	Thermoplastic elastomer	88 Shore A	Dissipative	135°C	BPCT / BPRT
● SR	Silicone rubber	86 Shore A	Dissipative	250°C	HRTR, HCTR
● FKM	Fluoroelastomer	85 Shore A	Dissipative	250°C	HRTE, HCTE, RT, PL
○ SIL	Silicone rubber	55 Shore A	Insulative	200°C	ST
○ 98AS	Thermoplastic elastomer	45 Shore A	Dissipative	100°C	FCTR / FRTR
○ 98AST	Thermoplastic elastomer (Lower Resistance)	45 Shore A	Dissipative	100°C	FCTR / FRTR

Ceramic ($Al_2O_3ZrO_2$) is a very pure white or black aluminum oxide material used in molding injection and sintering process.

The Pick-Up Tools made in Ceramic benefit from the SPT capillary manufacturing technology. Very small vacuum holes capability, low thermal conductivity and density make Ceramic an alternative to Tungsten carbide in small die size handling.

Ceramic tools are usually composed of a ceramic tip inserted or glued into a stainless-steel shank.

Tungsten carbide (WC) is a hard-metallic material composed of approximately a 1:1 ratio of tungsten and carbon atoms. For practical use, it is alloyed with a few % of a softer and strength metal, usually cobalt mixed during powder metallurgy including also milling, pressing and sintering. Carbides are generally classified based on the binder content and grain size. WC is widely used because of its extraordinary properties particularly suited to wear resistant tools. Combined with thermal resistance and electrically conductive characteristics, WC is the material of choice in many applications. Finishing processes like grinding, EDM & polishing give WC an excellent surface quality and very accurate dimension control.