TOOL MATERIAL SELECTION

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 ₂ O ₃ ZrO ₂		2000 HV10	Insulative	>500°C	AZ-CT
AZB	Black Ceramic Al ₂ O ₃ ZrO ₂		2000 HV10	Insulative	>500°C	AZB-CT, AZB-RT
W	Tungsten carbide		1700 HV10	Conductive	500°C	Collets , PL, CT, RT
\bigcirc 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
O 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
P 06	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
O 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 (Lowe Resistance)	er	45 Shore A	Dissipative	100°C	FCTR / FRTR

Ceramic (Al₂O₃ZrO₂) 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.