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
C	Ceramic Al_2O_3	2000 HV10	Insulative	>500°C	CT, 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	Insulative	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
PES	Polyethersulfone *	Rockwell M87	Dissipative	170°C	Consult nearest SPT office
DELS	Delrin (POM) ESD safe	Rockwell M74	Dissipative	90°C	CT, RT, 2151-CT, RPCT, PL
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
74A	Thermoplastic elastomer	88 Shore A	Dissipative	135°C	PCTR / PRTR
74AB	Thermoplastic elastomer	88 Shore A	Dissipative	135°C	BPCT / BPRT
SR	Silicone rubber	86 Shore A	Dissipative	250°C	HRTR , HCTR
FKM	Fluoroelastomer	70 Shore A	Dissipative	250°C	HRTE , HCTE, RT, PL
SIL	Silicone rubber	55 Shore A	Insulative	200°C	ST
SR	Silicone rubber	50 Shore A	Conductive	230°C	HSC
98	Thermoplastic elastomer	45 Shore A	Dissipative	100°C	FCTR / FRTR

Ceramic (Al_2O_3) is a very pure white/creamy aluminum oxide (99.9%) base 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 electrical 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.