

RF – welding of plastic films

For dielectric (RF) welding plastic materials with sufficient electric losses are required. The dielectric dissipation factor ($\tan \delta$) differs depending on the plastic material:

$\tan \delta > 0,1$	HF-heating easily
$\tan \delta > 0,01$	HF-Erwärmung possible
$\tan \delta < 0,001$	HF-Erwärmung impossible

The listed plastic materials (Tab.1) are suited for dielectric (RF) welding.

The plastic materials of Tab.2 have sufficient losses so that RF heating or welding is also possible. If other plastic material contains the heatable plastic to a sufficient degree it can be also RF heatable or weldable also the basic plastic material is not.

Plastic		$\tan \delta$ (at 1 MHz)	Remark
Polyvenylchlorid (soft)	PVC-P	0,12	
Polyurethan	TPU	0,07	For film thickness < 0,3 mm heating of electrodes (60 – 80°C) required
Ethylenvinylacetat	EVAC	0,03 – 0,05	Percentage of vinylacetat > 18%
Polyamid	PA	0,03 – 0,08	
Polyvenylchlorid (hard)	PVC-U	0,015	Heating of electrodes recommended (ca.80°C)
Polyethylenterephthalat	PET-G		Heating of electrodes recommended (ca.80°C)
Polyvinylidenfluorid	PVDF	0,17	
Polyvinylfluorid	PVF	0,08	

Tab.1: Plastic films in order of its RF welding capabilities

Plastic		$\tan \delta$ (at 1 MHz)	Remark
Thermopl. Elastomer	TPA		
Thermopl. Elastomer	TPS	0,01 – 0,03	
Acrylnitril/Butadien/Styrol	ABS	0,03 – 0,01	
Polymethylmethacrylat	PMMA	0,004 - 0,04	
Ethylen/Propylen-Dien	EPDM		Depending on its composition
Celluloseacetat	CA	0,03	Only heatable
Celluloseacetobutyrat	CAB	0,021	Only heatable
Cellulosepropionat	CP	0,03	Only heatable

Tab.2: Other RF heatable / weldable plastic materials

In addition other plastic films are available which are weldable through special modifications. One of these are RF weldable TPO films.