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Tech Talk Blog

Surface Energy of Plastics

Posted by [Frank Hild](#)

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The [dynamics of wetting](#) are described below:

Spreading = $A - (B + C)$

Where:

- * A = surface energy of solid (given below)
- * B = surface tension of liquid
- * C = surface energy of solid-liquid interface

If Spreading is:

- * Negative. Then, liquid will bead up.
- * Zero. Then, liquid will spread.
- * Positive. Then, liquid will spread.

Polymer abbr.	Polymer Name	Surface Energy (dynes/cm)	Contact Angles (degrees)
PES	Polyethersulfone	46	90
	Styrene butadiene rubber	48	
PPO	Polyphenylene oxide	47	75
	Nylon 6/6 (polyhexamethylene adipamide)	46	
PC	Polycarbonate	46	75
	Nylon-6 (polycaprolactam)	38	
PET	Polyethylene terephthalate	42	76
PMMA	Polymethylmethacrylate	41	82
SAN	Styrene acrylonitrile	40	74
	Polyimide	40	83
PVC r	Polyvinyl chloride, rigid	39	90
	Polyester	41	70
	Acetal	36	85
ABS	Acrylonitrile butadiene styrene	35	82
PPS	Polyphenylene sulfide	38	87
PVA	Polyvinyl alcohol	37	10
	Polyacrylate (acrylic film)	35	
PVC p	Polyvinyl chloride, plasticized	35	89
PS	Polystyrene	34	72
	Nylon-12	36	
	Surlyn ionomer	33	80
PBT	Polybutylene terephthalate	32	88
CTFE	Polychlorotrifluoroethylene	31	
PP	Polypropylene	30	88
PU	Polyurethane	38	85
PE	Polyethylene	30	88
PVF	Polyvinyl fluoride	28	
PVDF	Polyvinylidene fluoride	25	80
	Natural rubber	24	
PDMS	Polydimethyl siloxane (silicone elastomer)	23	98
FEP	Fluorinated ethylene propylene	20	98
PTFE	Polytetrafluoroethylene	19	120

If the material surface energy is relatively low, then [the coating](#) will not flow well and fisheyes, pinholes, gaps, or air bubbles will form. If the material surface energy is too high, then the paint, ink, or coating may bleed or be difficult to control. Therefore, the surface tension of the liquid and the surface energy of the material must be matched for the application.

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