

Inks and glues adhere only on clean and wettable surfaces



Measuring with test inks (DIN 53 364)

- 32 mN/m: spreading
Surface energy is higher than 32 mN/m
- 34 mN/m: wetting (rim)
Surface energy is greater than/equal to 34 mN/m
- 35 mN/m: no wetting
Surface energy is below 35 mN/m

Measurement is necessary:

- **before printing:**
solvent-based inks 38 mN/m
water-based inks 45 mN/m
- **before gluing:** at least 43 mN/m
- as a process control after pre-treatment/cleaning

Standards for assessment of the wettability

DIN ISO 8296 (9-2003) and ASTM D 2578-99a (2004)

Minimum wettability of film with two-dimensional application of the test inks

- Difficult application of test inks
- Low reproducibility +/- 2 mN/m (dyn/cm)

Main sources of trouble:

- Needs homogeneous thickness of ink layer
- Introduction of water with cotton sticklets

DIN 53 364 (4-1986) Wettability of films

Average wettability of PE-, PP- and PVC-films with the rim of brush strokes a series of test inks.

- Commonly used and simple application
- High reproducibility +/- 0.5 mN/m (dyn/cm)

Main sources of trouble:

- Application to unsuitable plastics
- Interpretation of inhomogenities

Followed by DIN ISO 8296, but still in common use.

AFCO-Recommendation C (1980)

Wettability of Aluminium-Foils from the drain off of water/ Ethanol-mixtures from inclined samples.

- Advantageous if the ink reacts chemically with the substrate.

Surface energy of solids

		[dyn/cm = mN/m]
Polydimethylsiloxane		14,1
Polytetrafluorethylene	PTFE	18,0
Polyethylene	LDPE	31,0
Polypropylene	PP	32,0
Polyethylene	HDPE	33,0
Polystyrol	PS	33,0
Polyoxymethylene	POM	38,0
Polyvinylchloride	PVC	39,0
Polyethylenterephthalate	PET	43,0
Polycarbonate	PC	46,0
Metals, metal oxides		>100
Iron	Fe	2550

The values depend very sensible on the purity and cleanliness of the surfaces. Additives, especially gliding agents and pigments can modify the values very strongly in technical materials. Water layers may mask metal surfaces and simulate a low surfaces energy.

Quantities of delivery

1. 30 ml bottle with a brush
2. 10ml test ink pen
3. 100, 500 and 1000ml supply bottle

We recommend our corona and APP-stations to increase the surface energy of your substrates.



Test inks

Series A: Formamid-Ethylenglykol following DIN ISO 8296, Series A ASTM D 2578-99a, blue	From 30 to 58 mN/m <ul style="list-style-type: none"> • Standard test inks • For PE, PP and similar • Not for PU and PVC (soft) • Poisonous
Series B: Methanol-Water-mixture follow DIN 53 364	From 23 to 72 mN/m <ul style="list-style-type: none"> • Suitable for PVC (soft) • 23 - 46 mN/m: poisonous • 48 - 66 mN/m: harmful
Serie C: Ethanol-Water-mixture, light-red	From 28 to 72 mN/m <ul style="list-style-type: none"> • Harmless for health • Not for every application
Series E: Alkane	16, 20 and 25 mN/m <ul style="list-style-type: none"> • Polarity = 0, transparent
Serie F: Water-table salt-mixture	77 and 82 mN/m <ul style="list-style-type: none"> • Harmless for health

Important note!

Do **not** compare surface energies obtained with different methods or different series of test inks!

We measure for you! Send us your samples.

Alternative measuring methods

Test pens:

- Easy handling
- Risk of contamination

Measurement of contact angle:

- Laboratory method
- Polarity can be calculated

Standard sets

19001:

Set for metals (Series A + E)
4 x 30ml: 20, 30, 38 + 46 mN/m

19002:

Set for plastics (Series A)
4 x 30ml: 34, 38, 44 + 46 mN/m

19003:

Additional set (Series A)
4 x 30ml: 30, 40, 52 + 58 mN/m