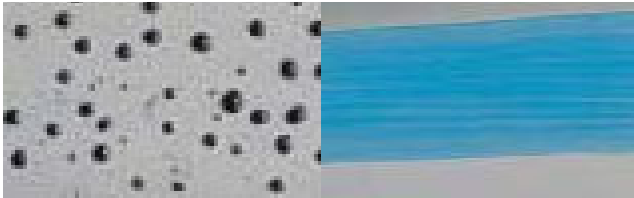




Task

Inks and glues adhere only on clean and wettable surfaces

Surface energy is a measure of wettability



no wetting

wetting

(Test ASTM D 2578-99)

Measurement of surface energy is necessary

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

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

Standards for assessment of the wettability

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 in application
- High reproducibility ± 0.5 mN/m (dyn/cm)

Main sources of trouble:

- Application to unsuitable plastics
- Interpretation of inhomogeneities

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

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

Minimum wettability of film with two-dimensional application of 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

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.

Hints and quantities of delivery

Surface energy of solids

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

The values depend very sensible on the purity and cleanliness of the surface. 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 surface energy.

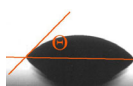
Alternative measuring methods

Test pens

- Easy to handle
- Not safe due to risk of contamination

Measurement of contact angle

- Laboratory method
- Polarity can be calculated



Test inks

Series A: Formamide-Ethylenglycol following DIN ISO 8296, series A and ASTM D 2578-99a, blue

In 1 mN/m-steps from 30 to 58 mN/m

- Standard test inks
- For PE, PP and similar
- Not for PU and PVC (soft)
- Poisonous

Series B: Methanole-Water-mixture following DIN 53 364, series B and DIN ISO 8296, red

In 1 mN/m-steps from 23 to 72 mN/m

- Suitable for PVC (soft)
- 23 - 47 mN/m: poisonous
- 48 - 64 mN/m: harmful

Series C: Ethanol-Water-mixture, red

In 1 mN/m-steps from 30 to 72 mN/m

- Harmless
- Not yet in common use

Series D: Formamide-Water-mixture following DIN ISO 8296, blue

In 1 mN/m-steps from 58 to 72 mN/m

- Poisonous

Series E: Alkane-series

16, 18, 20, 22, 24, 25, 28 and 45 mN/m

- Polarity = 0, transparent

Series F: Water-table salt-mixture

77 and 82 mN/m

- Harmless

Quantities of delivery

- 30 ml bottle with brush or pipette
- 100, 500 und 1000 ml supply bottle
- External control measurement
- Taking back of residue

Standard sets for your application

19001: Set 3 for metals (Series A + E)
4x30 ml: 20,30,38+46 mN/m brush

19002: Set 1 for plastics (Series A)
4x30 ml: 34,38,44+46 mN/m brush

19003: Additional set 2 (Series A)
4x30 ml: 30,40,52+58 mN/m brush



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.**