

The unit of measurement of Surface Energy is Dyne/cm² this can also be expressed in mN/m.

Dyne = Unit of force equal to the force that imparts an acceleration of 1cm/sec/sec to a mass of 1 gram.

1 Dyne/cm² = 0.00001 Newtons.
or
1 Dyne/cm² = 1mJ/m²
or
1 Dyne/cm² = 1mN/m

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Surface Energy, Surface Tension Test Measurement Fluids in a Kit

An alternative to Dyne Pens, the Dyne Test Ink that can measure surface energy & surface tension



- **Type A:** Formamide, 2-ethoxyethanol based inks, not suitable for soft PVC (formulated to ISO 8296)
Available values:
23 - 73 mN/m (Dynes)
- **Type B:** Ethanol based solutions (NON-TOXIC), not suitable for polypropylene
Available values:
30 - 73 mN/m (Dynes)

Dyne Technology Ltd supply a complete range of Dyne Test Inks to measure the surface energy (sometimes referred to as surface tension) of various substrates. The test fluids can be purchased as a kit holding 6 bottles or as individual bottles. The surface energy test fluids are easy to use and have immediate results (within 3 seconds). The test inks come in 20ml bottles and have an expected lifetime of 12 months. Unlike the Dyne Pens, the test fluids will not cross contaminate if used with cotton applicator swabs.

Using the Dyne test liquid gives quick and easy results indicating surface wettability. The low surface energy of polymer-based substrates often leads to poor adhesion of inks, glues and coatings. To obtain optimum adhesion, it is necessary to increase the surface energy of the substrate to just above that of the material to be applied. Surface Treatment with either Plasma or Corona results in good wetting of the material over the surface of the substrate and so improves adhesion.

For optimum adhesion when printing, gluing or coating on various substrates, it is necessary to obtain a high surface energy. Determining the surface energy can be achieved by measuring contact angle or by use of Surface Energy Test Liquids or Pens (Dyne level testing).

This form of measurement is based on the ISO method for measuring the surface energy of polyethylene film. When the Dyne level test liquid is applied to the surface, the liquid will either form a continuous film on the surface or pull back into small droplets. If the Dyne test fluid remains as a film for 3 seconds, the substrate will have a minimum surface energy of that fluid value, expressed in mN/m (Dynes). Should the Dyne test fluid reticulate or draw back into droplets in less than 1 second then the surface energy of the substrate is lower than that of the fluid itself.

The exact surface energy (Dyne level) can be determined by applying a range of increasing or decreasing values of Dyne test fluids.



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