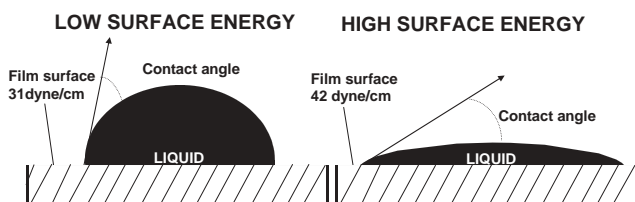


### Why corona treatment

The problem with writing or printing on plastic films is known. You have a plastic bag and you would like to write on it with a pen, but unfortunately the ink doesn't stick to the plastic since the untreated plastic has a structure, which makes it impossible to both write and print on it due to poor adhesion.

#### What causes the adhesion problems?

Whether a liquid wets a material well or poorly depends primarily on the chemical nature of both the liquid and the substrate. Wetting is defined as the ratio between the surface energies of the liquid and substrate.



Material – Basic	Dyn/cm
PP	29
PE-LD	31
PE-HD	32
BOPP	32

Process - Application	Dyn/cm
Print – solvent based ink	40-42
Print – water based ink	46-48
Coating	44-54
Lamination	46-56

In general, the following rule is true: "A material will be wetted, if its surface energy (=dyn/cm) is higher than that of the liquid and if not there will be an adhesion problem. First figure is shown what's the basic dyn-level of a material and what's required in the different applications.

#### How to avoid adhesion problems?

To obtain sufficient wetting and adhesion on plastic films or metallic foils in-line pre-treatment just before the printing, laminating or coating unit is necessary. The solution to optimise the wetting and adhesion is by using a corona discharge unit since this technique has proved to be highly effective, cost effective and can take place in-line.

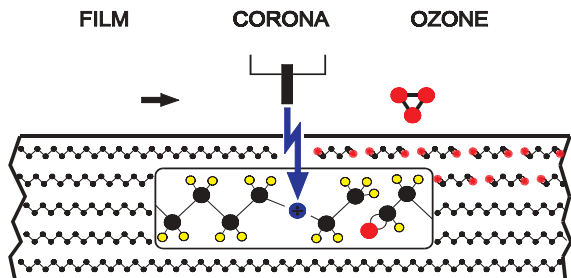


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# Corona-Plus

## What is corona treatment

Corona is in short a high frequency electric discharge towards a surface. The result from this is an improvement of the chemical connection (dyn/cm) between the molecules in the plastic and the applied media/liquid. This surface treatment neither reduces nor changes the strength and appearance of the material.



## Determination of treatment level

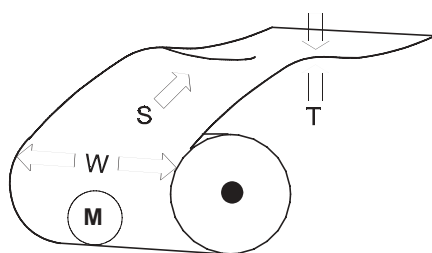
The effectiveness of corona treatment depends on the material being used. There are no limits with regard to the materials that can be corona treated, although the required treatment/intensity level (watt/min/m<sup>2</sup>) may vary within a wide range.

The treatment level depends on the material being used, the required dyn-level, the machine speed and the number of sides to be treated.

Regarding the material the following has to be taken into consideration: the age and width of the material and whether the material has been pretreated.

The treatment level can be calculated by using the following formula:

$$\text{Power (watt)} = T \cdot S \cdot W \cdot M$$



- P = Total Power (Watt) required
- T = Number of sides to Treat (single/double sided)
- S = Line Speed (in metres per minute)
- W = Film Width (in metres)
- M = Material factor (required Watt per m<sup>2</sup> per minute)

The exact value is best determined by testing a sample of the actual film that is used for a specific application.

## Automatic power regulation

Vetaphone's Corona-Plus treaters are equipped with automatic power regulation. When the needed treatment level (watt/min/m<sup>2</sup>) has been determined, the Corona-Plus unit is set and due to the automatic power regulation the film is now influenced by the same

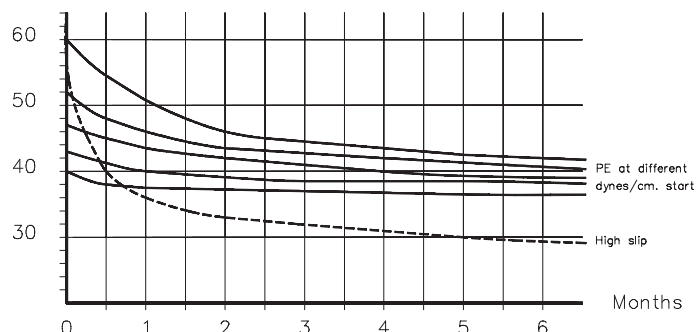
energy irrespective of the speed or the width of the film.

## Durability

Over time the obtained dyn-level will fall and it can be necessary to corona treat the material again just before use. Especially if the material contains slip the dyn-level will fall faster.

Thicker and older film stocks are more difficult to treat as slip agents may have migrated to the surface. Material which has not been treated under extrusion can be difficult to treat afterwards. Therefore it's recommended to use pre-treated film that just need a corona refreshment.

Dynes/cm.



## Maintenance

To obtain the desired dyne-level it's important that the insulator are kept clean. The last major innovation to optimise set-up of electrodes and maintenance is the unique Quick Change (QC) system. The complete Corona electrode is here mounted in a specially designed pull-out / push-in cartridge.

The operator can easily perform daily maintenance without removal of the treatment material. Especially the possibility of keeping maintenance at an absolute minimum has proven very popular.

The Corona-Plus treater station also remarks itself by the advantage of working in very moistly and extreme environments.

## Generator

Vetaphone's Corona-Plus generators with a power range from 1 to 80 kW are equipped with the unique resonance system which guarantees the most efficient generator on the market.



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