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Watt Density

How converters optimize corona treatment

Watt density is a useful measurement to specify the treatment level for a given material. By properly accounting for line width, line speed, and the approximate watt density for a material, converters can ensure treatment to their desired dyne level.

The desired dyne treatment will depend largely on what must be bonded to the film or substrate. Many common filmic materials such as polypropylene (PP), polyethylene (PE, LDPE, LLDPE, HDPE), and polyester (PET) can be readily treated with conventional air corona systems.

More complex fabrics, non-wovens, or specialized films may require plasma treatment. Regardless of the treatment type the watt density will be an important consideration when running specific jobs/structures or specifying a new corona treater.

The equations to the right show two ways to utilize watt density. In the first scenario, the watt density, line speed, and width are known. However, the power supplied to the corona treater must be determined. This is commonly used when specifying a new system.

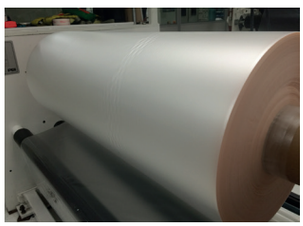
In the second equation we solve for watt density when it is unknown. For example, you are running a standard application with a fixed power, but your demand has doubled and line speed must increase. We can first determine watt density on the current line then use that with the targeted speed and width of a new line to determine the new power needs.

$$\text{Power}_{\text{(watts)}} = \text{Watt Density}_{\text{(W-min/ft}^2\text{)}} \times \text{Line Speed}_{\text{(ft/min)}} \times \text{Width}_{\text{(ft)}}$$

$$\text{Watt Density}_{\text{(W-min/ft}^2\text{)}} = \frac{\text{Power}_{\text{(watts)}}}{\left(\text{Line Speed}_{\text{(ft/min)}} \times \text{Width}_{\text{(ft)}}\right)}$$

Watt Density (W-min/ft²)

Dyne Level (mN/m)				
Material	**38-40**	**43-45**	**50-60**	**60+**
LDPE	0.8	1	1.3	1.5
HDPE	1.3	1.5	2	2.5
LLDPE	1.3	1.5	2	2.5
PET	1	1.3	1.5	2
PP	1.5	2	2.5	3
BOPP	2.5	3	2.8	3
Metalized	1.5	1.8	2.5	3
Paper	1	2	10	16+



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