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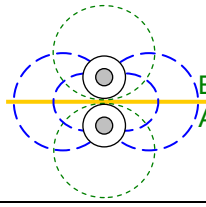

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Controlling Static in Winding Rolls

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Abstract

The goal in controlling static in winding rolls is for your customer to unwind a neutral roll in the next operation. Three sources of static in unwinding rolls are reviewed.

(1) Static charge on the web that is wound.

(2) A pattern of static charge where the outside web surface has negative charge and the inside surface has an equal amount of positive charge.

(3) Lap-to-lap contact charging between the outside and inside side surfaces of the web.

These two sources of "process static" should be controlled when winding the roll. The third source is best solved by proper formulation of the coating during the product design.

The first source of static is measured using an electrostatic fieldmeter located on a web span between two conveyance rollers as close to the winding roll as can be practically measured; typically 2 or 3 rollers upstream of the winding roll. For good control of the static in the winding roll, the electric field should have a mean of zero and should not deviate more than ±0.5 KV/cm. The rationale for this specification on the electric field is presented.

The second source of static is the very common pattern of negative charge on the outside surface of the web and an equal amount of positive charge on the inside surface of the web. While this web is electrically neutral, the pattern of charge is shown to cause the winding roll to have an increasing electrical potential resulting in dirt attraction, sparks and high levels of static when unwinding the roll. This pattern of charge is measured using a non-contacting electrostatic voltmeter located 2 mm from the web surface where it is wrapped on a grounded, metal conveyance roller. The surface potential of the web varies linearly with the thickness of the web. For good control of the static in the winding roll, the surface potential of the web should have a mean of zero and should not deviate by more than ±2.5 volts for each 0.001 inches (25 μm) web thickness. The rationale for this specification on the web surface potential is presented.

Finally, an active ionizer should be located facing the winding roll to control the electric potential of the winding roll caused by the nonzero deviations of the electric field and the web surface potential. The role of this winding roll ionizer working together with the upstream static neutralizers is discussed.