

Contact clears the way

Teknek advances web cleaning and static control

In recent years there has been an increasing trend towards the use of coatings which contain nanoparticles being applied to webs to enhance their functionality, especially their optical properties. However, these coatings are extremely thin and therefore very susceptible to defects caused by microscopic particles of contamination on the surface of the web.

The only effective way of removing these particles is through the use of contact cleaning technology. However, as this involves touching the surface of the web with the cleaning roller, there is an interaction, caused predominately by static electricity, between the roller and the substrate which can have a detrimental effect on the quality of extremely thin coated layers.

The consequences of contamination and static in the converting industry are well known – lower production yields, increased material wastage and greater downtime when problems arise.

Teknek invented contact cleaning technology over 20 years ago and has remained at the forefront of technological developments in this sector ever since. The company has responded to the increased use of thinner coatings with the development of a second generation contact cleaning system – Nanocleen – which is said to offer enhanced cleaning and static elimination capabilities.

Advantages claimed for Nanocleen include the ability to remove much smaller particles – down to 25nm. It is also said to be capable of removing 25-50 per cent more particles than other contact cleaners.

In addition, the contact roller and

adhesive roll are 100 per cent silicone-free. The polymer roller dissipates static as well as removing contamination. According to Teknek, it reduces static by a factor of 10 compared with traditional contact rollers. This is especially useful when processing very thin film that tends to cling to the roller due to static.

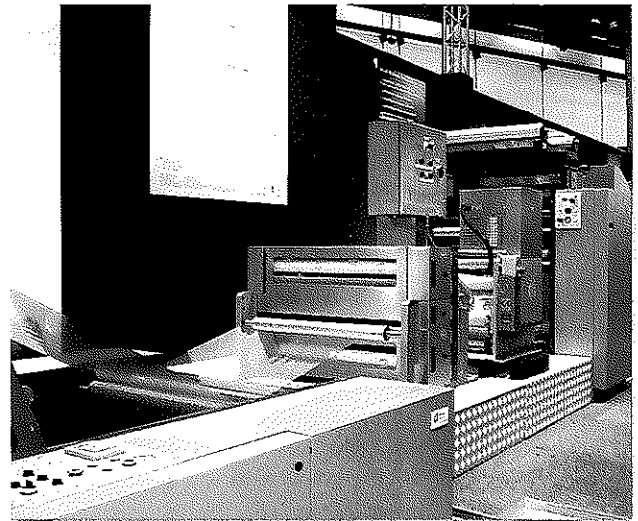
Nanocleen is also said to have a very low impact on surface energy – it does not affect surface energy unlike traditional contact cleaning which can reduce it by 7 Dyne.

The new system can be installed on old and new Teknek machines, as well as other makes of contact cleaning equipment.

The Nanocleen technology has been beta tested by a number of Teknek's customers, including a major Japanese company whose process is adversely affected by static and who carried out extensive trials with Nanocleen with a view to improving yields. Experiments were conducted with Nanocleen and a web contact cleaner using traditional cleaning core components. Table 1 demonstrates the special static dissipation properties of the Nanocleen system.

The Nanocleen cleaning roller is made using a specially formulated polymer which amongst other things is inherently conductive, and therefore conducts static charge away to earth.

Web cleaners come in many forms, with contact web cleaners being the most effective. However, some use components which reintroduce organic contamination onto the web. This is primarily due to two factors. Firstly, the base polymer of the cleaning roller is PDMS – a silicone. Secondly, the



adhesives used in these systems all have a silicone release coating which can transfer the silicone on to the cleaning roller and then on to the substrate.

Teknek says that extensive trials of Nanocleen with a major Asian supplier of coating and converting equipment used to produce very thin films (in particular optical films) have shown that by replacing traditional cleaning core components – cleaning roller and adhesive – it ensures that issues relating to poor coating performance due to the cleaning system have been eliminated.

Nanocleen is said to be the world's only 100 per cent silicone-free contact cleaning system, and the only one without a silicone release coating on the adhesive.

The role of contaminants from the cleaning roller and the impact on the surface energy of the substrate were investigated by a major US producer of technical films. The impact of the cleaning roller on the substrate was measured using a highly sensitive technique called ToF-SIMS (Time-of-Flight Secondary Ion Mass Spectrometry). According to Teknek, this showed that Nanocleen was "the only commercially available cleaning roller which left nothing on the surface it had cleaned".

Installation of Teknek contact cleaning system

Static voltage levels measures on the web after web cleaning

	Static elimination bars	Static elimination bars
	OFF	ON
Traditional contact cleaner	1000V	100V
Nanocleen™	100V	-10V

CONTACTS

Teknek

www.teknek.com

www.nanocleen.info