

How clean is your web?

Roy Cannon, Teknek's converting product specialist, explains why contact cleaning is the most effective method to use

Today's demanding converting environment has made it vital that converters achieve the best possible performance from their machines and systems. The ultimate goal is to maximise output with minimal machine stops and as little waste as possible, to produce an end product of the highest quality possible.

Continuous operation with the least possible disruption is the Holy Grail for converters. But can this be achieved? One of the key obstacles to reaching 'converting nirvana' is the presence of contamination.

Dust, dirt, fibres, lint, insect debris all affect runnability – the ability and to produce a product at optimum machine speed. Particles on the web means that production is severely disrupted – machines are stopped so that print plates, impression rollers and other components can be cleaned before operations can be resumed.

To successfully clean a moving web, the influences that cause the contamination in the first place need to be understood.

Often it is simple to understand where much of the contamination comes from – paper, corrugated and film production, and from the processes used by a converter such as slitting, bag making, coating and laminating. However, the production environment itself is also a rich source of contaminants, dirt and debris. Slitter dust, chaff from sheeting, loose paper fibres, additives and powders, and also people, can mar the appearance of a product substantially.

To make matters worse, the static charge produced by the moving web holds these particles tight to the web.

Web speeds complicate the issue as the faster the speed, the higher the electrostatic charge or attraction. For this reason, any web cleaning method must be used in tandem with effective static neutralisation equipment to prevent recontamination.

Methods for cleaning a web range from

fitting clean rags to a transverse bar (not terribly effective and a possible health and safety issue) to devices which use blowers, vacuums, brushes and ultrasonic waves to

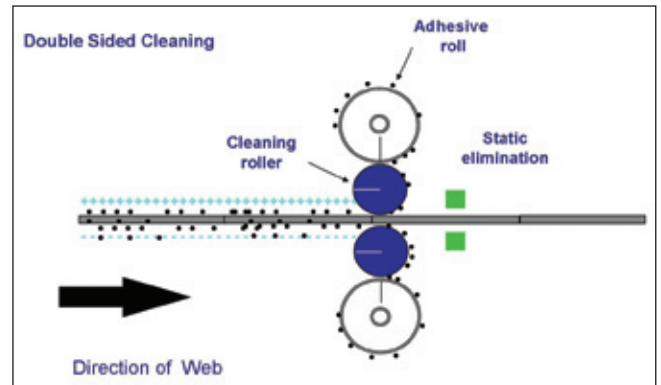
remove contaminants from the web. However, each of these techniques has its own drawbacks.

For example, where vacuum based systems are employed, great care must be taken in the positioning and configuration of the equipment, so that the power of the vacuum is applied across the entire web width. The slightest break in the seal between the vacuum and the web will mean that the effectiveness of the device is compromised. Such systems are reasonably successful in removing moderate levels of contamination (particles of around 150 micron and greater). However, in most modern converting plants the ability to remove much smaller particles is essential.

Where mechanical brushes are used there is the possibility that sensitive materials, such as thin film, can be scratched by the brushing action. Other methods use static elimination bars in conjunction with vacuum actions which make direct contact with the web.

Two key issues determine the effectiveness or otherwise of the cleaning method employed – static charge and the boundary layer of air. In addition to the static problem, a moving web also creates a boundary layer of air which has to be penetrated if the cleaning operation is to have any effect. This layer of air acts to hold particles, making it virtually impossible to remove contaminants without somehow penetrating this boundary layer.

Contact cleaning technology (pioneered by Teknek) is a successful and cost-effective method of web cleaning. This uses a specially formulated elastomer roller that gently runs in direct contact with the web. The roller surface



attracts particles down to one micron in size and these are then transferred on to a special reverse wound pre-sheeted adhesive roller, where they are permanently trapped. When the adhesive roller becomes saturated with contaminants, the outer pre-sheet is simply removed, leaving a fresh one underneath.

Although the roller makes direct contact with the substrate, its special formulation ensures that there is no damaging or contamination of the web surface, even with sensitive materials. Once the material has been through the contact cleaning process, static neutralisation bars placed immediately after the cleaning unit remove any electrostatic charge which could lead to recontamination of the substrate.

The contact cleaning process has been further enhanced with the recent introduction of the Nanoclean system from Teknek. This technology can remove much smaller particles – down to 25nm – as well as removing up to 50% more particles than other contact cleaners. In addition, the roller itself dissipates static by a factor of 10 compared with traditional contact cleaners. This is especially useful when dealing with very thin film which has a tendency to cling to the roller.

The Nanoclean system can be fitted to both old and new versions of the Teknek Clean Machine, as well as other makes of contact cleaning equipment. ■

Contact

- www.teknek.com
- www.nanoclean.info