



Non-stick technology for improving the efficiency of paper mills

TEFLON* is widely recognised for domestic and industrial applications for its non-stick properties and is increasingly being used in the paper industry. The Teflon* surface works by giving the covered equipment a much lower surface-energy. Since the fluoropolymer PTFE (polytetrafluoroethylene) has a lower surface energy than any known material on earth, water and other hydrophilic materials, such as cellulose, are effectively repelled.

Paper mills provide a growing customer base for Teflon* technology because the sticking of hydrophilic materials such as cellulose fibres or other additives can lead to fibre build-up - which in turn causes an increase in downtime for cleaning and an increase in defects on the finished paper product.

Until recently, there were two methods to achieve a non-stick Teflon* surface

- a) High Temperature cure Teflon* spray coatings.
- b) Teflon* heat shrinkable sleeves.

a) Spray Coating

The application of Teflon* spray coatings for paper mill applications originated with high-temperature cure coating systems. For this procedure, the relevant piece of plant or equipment is shipped to an applicator that coats it, then bakes it at temperatures of up to 400°C. This method gives a good non-stick coating, but the application process is difficult in terms of transportation, as well as expensive in downtime.

b) Teflon* Sleeves

The fitting of Teflon* heat shrinkable sleeves to rollers and drying cylinders provides a thick layer of Teflon* usually not less than 0.5 mm. Its chief area of use is in the drying section of the Paper Machine, particularly in the area of the size press. Of course, since they are sleeves, their use is restricted to rollers and cylinders only.

Recently, however, an effective method of providing a Teflon* surface for wet-end equipment has been developed which can be applied with relative ease both at the mill and at room temperature. It is known as Teflon* MicroCoat.



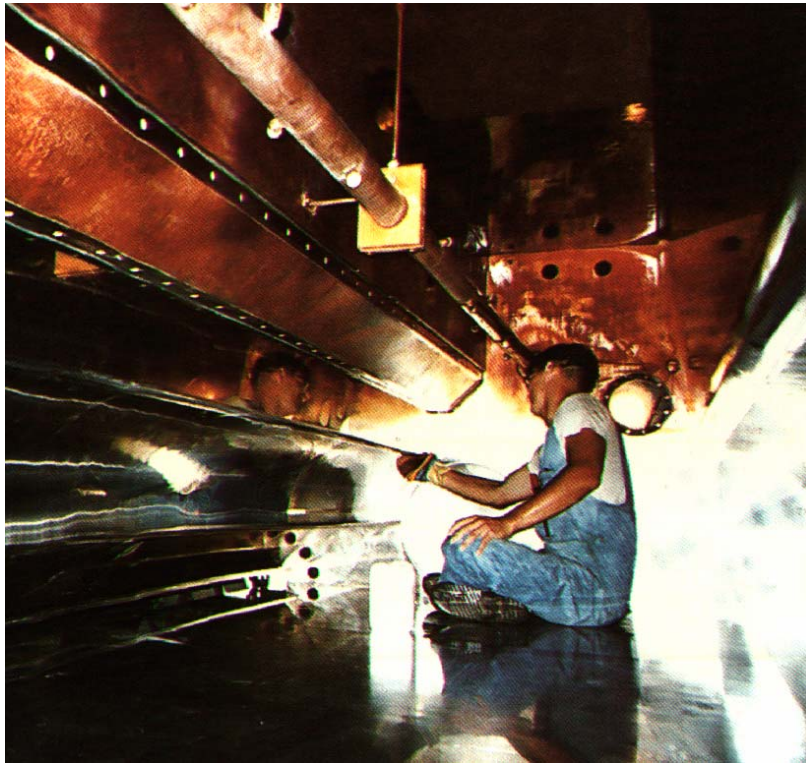
Results in the wet-end

The best results for this technology are in the wet-end of the mill (headboxes, suction boxes and rolls in the press section). In these applications, fibre build-up is reduced, meaning less time is needed for cleaning operations.

Teflon* MicroCoat also improves the performance of the mill during normal running. One example of this is in the release of paper from rolls in the wet section. Differences in release properties between adjacent rolls can cause difficulties because of the need for a speed differential between rolls. However, the differences can be lessened with Teflon* MicroCoat - a considerable advantage when one roll is handling paper which is much wetter and stickier than that on the roll next to it. For example, a mill in Finland used Teflon* MicroCoat to reduce the speed differential from 3.7 - 2.5 per cent, making control much easier.

Doctoring

Doctoring of Teflon* - covered rollers and cylinders has been a cause for concern in paper mills for two reasons. First, it is difficult to doctor a roll that is coated and, second, the wearing of doctor blades can be expensive. Traditional Teflon* systems are difficult to doctor because they are applied either as a sleeve of 0.5 mm thickness or more or as a coating of around 40 microns. In both cases, doctoring will be liable to damage the Teflon* surface. One of the key differences of the Teflon* MicroCoat technology, in comparison with the two systems described above, is that it is much thinner. Typically, the coating is less than 5 microns, meaning that it is more of an impregnation into the porosity of the coated substrate's surface than a typical coating. This means that the doctor blade does not have the opportunity to key into the fluoropolymer. Consequently, Teflon* MicroCoat has been successfully used on a range of rolls which have been doctored.



Applications

This Teflon* MicroCoat system has been applied to a wide range of surfaces, including steel, granite, synthetic-granites (Valrok*, Microrok*), ceramics, and hard and soft rubber.

Granite and synthetic-granite surfaces are typically press rollers (an area where Teflon* coating was previously not allowable). Applications on steel have usually been headboxes, and the hard and soft rubbers have been rolls in the wet-end.

Development History

Teflon* MicroCoat was developed by Releco, a DuPont customer in Finland. Since 1992, Releco has gone on to make over 200 applications, almost all of which are for wet-end mills in Finland, with some work being undertaken in the UK.

In 1996 DuPont formally agreed with Releco to jointly market the new technology to pulp and paper mills around the world. Since then, Teflon* MicroCoat has been successfully applied in Belgium, the Netherlands, Germany and the USA.

In March 1998, Holscot were granted a license to apply MicroCoat throughout the UK and Ireland.

Installation

The speed of application is a major advantage when implementing the Teflon* system. As this system is applied on-site and at room temperature, most jobs can be done in less than one day - sometimes even in one half day. Consequently, an application can easily be fitted into even a short shutdown. It is possible to coat rolls while they are in the machine, but a higher-quality finish is produced when the roll is mounted clear of the machine and turned with a lathe.

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