

Topsheet finishes

Dr Stephan Reil, Pulcra Chemicals, Düsseldorf, Germany, outlines the enhanced properties possible in nonwovens for diapers with the company's Stantex and Belsoft products

With years of experience and expertise in textile chemicals, Pulcra Chemicals continues to be at the forefront of research on finishing nonwovens for hygiene applications. We have recently developed two Stantex S finishes especially for diaper topsheet, both with excellent skin compatibility and superior durable hydrophilicity. In addition, we have developed the Belsoft Care lotion for diaper top sheet.

The current Stantex/Selbana portfolio of nonwoven finishing-chemicals covers a range of production processes and polymers including PP, PET, PA and viscose, as well as bicomponent fibres such as PE/PP and PE/PET. These finishes offer an extensive repertoire of resulting product properties and do not contain any silicones.

The most important finishing chemicals from the Pulcra Chemicals range for nonwovens include the following for the hydrophilic topsheet of diapers:

- Stantex S 6327, tailored for spunbond/spunlaid nonwovens from

PP. It imparts durable hydrophilicity and complies with all relevant health and safety standards such as BfR / FDA CFR 21.

- Stantex S 6087-4 and Stantex PP 602. These finishes can be used in all web forming processes for nonwovens based on a variety of polymers like PP, PET or even bicomponent fibres. Stantex S 6087-4 additionally imparts durable hydrophilicity and provides an exceptionally soft handle.
- Stantex S 6051. A finish for nonwovens formed via the carding of staple fibres. It allows bonding thermally and via needle punching. This product complies with all relevant health and safety standards.

Finishes for hydroentanglement are Stantex F 1610 and Stantex F 6397X, which do not generate foam, and are therefore used for the production of wipes from nonwovens formed via hydroentanglement.

Belsoft Care 6287 is a lotion that contains vitamin E and cosmetic waxes for proven skin care effects. It is applied

during the production of the diaper. This product does not interfere with the durable hydrophilicity of the topsheet.

Rapidly wetting lubricants for needlepunched staple fibre nonwovens are Selbana UN and Selbana 4236. Selbana UN is biodegradable, whereas Selbana 4236 imparts a clear surface structure.

Durably hydrophilic

A topsheet material for a diaper or other absorbent hygienic product has to keep the skin dry. Such a material therefore needs to swiftly transport liquid through the nonwoven. The liquid then needs to be transferred repeatedly. The resulting main properties for a coverstock are instant wettability and durable hydrophilicity.

A topsheet needs to maintain a barrier layer between the absorbent core and the skin. Any liquid possibly remaining in the topsheet needs to be retained, requiring a low rewet property. Last but not least, the skin friendliness of the topsheet is essential. During urination, the skin will be temporarily wet and under these

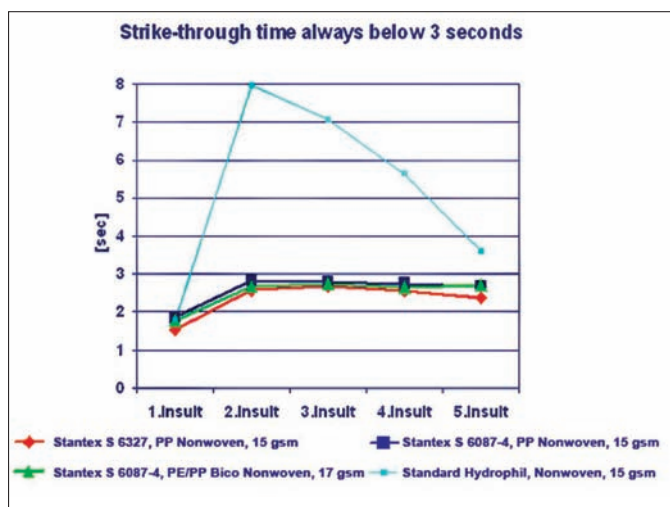


Table 1: Multiple strikethrough WSP EDANA 70.7 (05) on different kinds of polymers

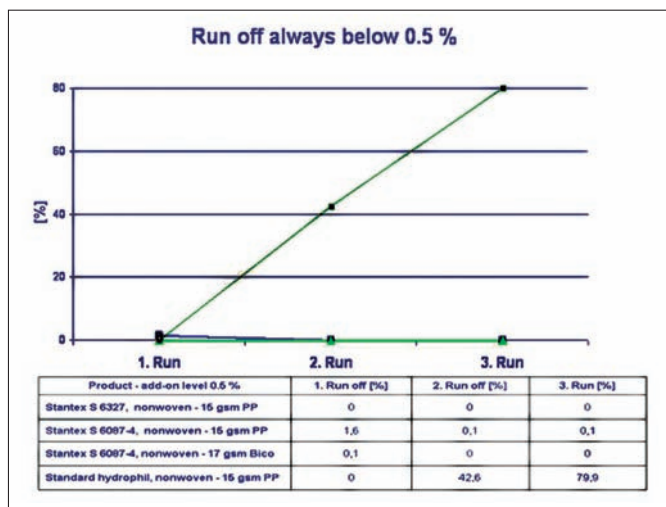


Table 2: Run off WSP EDANA 80.9 test on different kinds of polymers.

conditions the topsheet of an absorbent hygiene product should be very soft to ensure that no skin irritation takes place.

Features such as permanent hydrophilicity and skin friendliness can be easily achieved using Stantex spin finishes for the topical treatment in a cost-effective and flexible way. Pulcra Chemicals has developed Stantex S 6327 and S 6087-4 for the treatment of nonwovens made from different kind of polymers for diapers and other hygienic applications with excellent properties. Both products are silicon-free, provide durable hydrophilicity and show excellent skin compatibility.

Stantex S 6327 is a spin finish for the PP topsheet material of absorbent products. It complies with the guideline for the evaluation of personal sanitary products of the German Federal Institute of Risk Assessment (BfR) and the following paragraphs of the US FDA Code of Federal Regulations Food and Drugs Title 21 (176.210, 176.170, 177.2800, 177.1850, 177.1520). All components are also mentioned on the lists of annex II and III of EU directive 2002/72/EC.

Stantex S 6087-4 is a spin finish for PP, PET and PE/PP Bico nonwovens and can be used in all web forming processes. It provides a very soft touch to the spunbond nonwoven.

Both Stantex 6327 and Stantex S 6087-4 show outstanding overall performance in relation to the WSP EDANA test methods and excellent skin compatibility. The technical excellence of these two products has already made them favoured choices on the market. Tables 1 and 2 opposite demonstrate the performance of these two finishes on various polymers. Results for multiple strike through are excellent, being achieved with values below 3 seconds for the fifth insult with Pulcra's Stantex products. The run off is less than 2% and below the commonly sought after 5%. The coverstock wetback is below 0.2 g. The surface tension reduction is also very low.

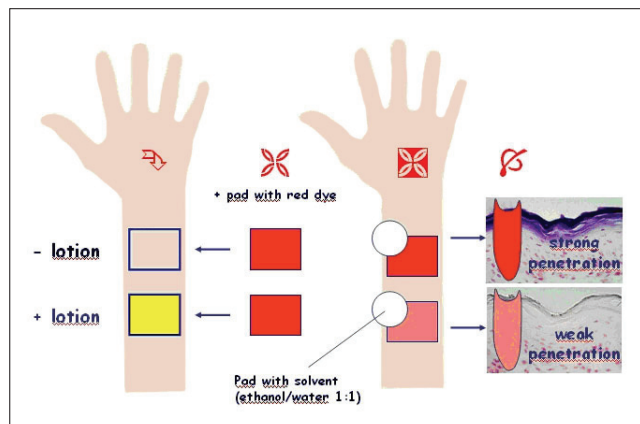
Belsoft

Whereas durable hydrophilicity and softness of a nonwoven are major issues for the good overall performance of an absorbent product, an additional way to add skin care properties onto a

topsheet material is by using a lotion as a topical treatment.

Belsoft Care 6287 is a combination of cosmetic waxes which are solid at room temperature and can be applied as a melt to the topsheet by various thermal techniques. It partially melts at body temperature and is transferred to the skin via the topsheet. It has a moisturising and anti-inflammatory effect on the skin while simultaneously making the topsheet soft and supple. Dermatological studies show that the lotion acts as an effective barrier to contact with unwanted moisture.

In a moisture barrier study, Belsoft Care 6287 was applied on the lower forearm and a saline solution simulating the density and ionic strength of urine and containing a dye was placed on a medical pad. The pad was applied to the skin area treated with the lotion. Another pad was applied to the untreated skin. After six hours the pads and lotion were carefully removed and a gauze swab moistened with 1 ml of ethanol/water solution was used to extract any dye that had penetrated the skin. The extract was then analyzed spectroscopically and demonstrated clearly that Belsoft Care 6287 inhibits the penetration of simulated urine onto the skin by over 40%.



Dermatological study – skin barrier test

As formerly part of Henkel, one of the world's leading cosmetics companies, Pulcra Chemical's continued commitment to research makes it a global player in textile, fibre and leather technology.

The company's competence covers all the steps in fibre and textile treatment, from spinning and weaving, through pre-treatment, dyeing and printing to finishing of nonwovens, fabrics and garments.

As a single-source solution provider Pulcra has production facilities, service centres and sales offices in ten countries. The company takes care of the regulatory requirements and of the prevailing trends in respect of health and safety, ecological sustainability, wear comfort and innovation.

The table below summarizes some of the most important finishing chemicals, especially applied on nonwovens for hygiene applications:

Process	Product	Properties	Features
Carding/ staple fibre	Stantex PP 602	Hydrophilic	<ul style="list-style-type: none"> ● Good antistatic protection ● High and fast wetting properties
	Stantex S 6087-4	Durably hydrophilic	<ul style="list-style-type: none"> ● Provides very soft handle ● Very good carding behavior
Spunbond/ spunlaid	Stantex S 6051	Hydrophilic	<ul style="list-style-type: none"> ● Complies with BfR / FDA CFR 21
	Stantex S 6327	Durably hydrophilic	<ul style="list-style-type: none"> ● Complies with BfR / FDA CFR 21
	Stantex S 6087-4		<ul style="list-style-type: none"> ● Provides very soft handle ● For PP, PE/PP and PE/PET bico fibres
Spunlace / hydro-entanglement	Stantex F 1610	Hydrophilic	<ul style="list-style-type: none"> ● Low foaming
	Stantex F 6397X	Hydrophilic	<ul style="list-style-type: none"> ● Low foaming
Topsheet lotion	Belsoft Care 6287	Contains vitamin E and cosmetic waxes	<ul style="list-style-type: none"> ● Provides skin care ● Does not interfere with strike through behavior
Needlepunch	Selbana UN		<ul style="list-style-type: none"> ● Good antistatic protection ● Biodegradable
	Selbana 4236		<ul style="list-style-type: none"> ● Good antistatic protection ● For structured materials