

Going undercover

The old saying that it is what's on the inside that counts has never been truer, especially in the world of functional apparel. Layering has long been recognised as vital in functional clothing with regard to thermoregulation, moisture management, and comfort and this has to begin with a high performance base layer.

Swiss-based Odlo, whose Norwegian founder, Odd Roar Lofterød, began producing sport specific underwear in 1946, offers different levels of support in three categories depending on the level of activity, designed in lightweight fabrics that provide comfort and temperature regulation, through moisture transport.

In its underwear ranges Odlo offers four lines, each with its own colour code: blue for cool, orange for light, red for warm and ruby for extra warm. This means that depending on the kind of sport and the time of year, the sportsman can choose the relevant level of moisture transport, warmth and/or protection against the wind and weather.

For autumn/winter 2005/2006 Odlo has developed an improved range of technical underwear, Cubic.

Cubic incorporates the established properties of lightweight support integral to Odlo's products, but took the bodywear one step further in terms of climate regulation through changing the weave of the fabric, which takes on a cubic construction, hence the name. This new cubic weave – which has been used in Odlo's long and short sleeved shirts, long pants, panties and boxer shorts – stores air and therefore ensures a comfortable temperature in all climates from sub-zero to warm. The structure also reduces the contact surface between the skin and the fabric, thus eliminating problems of the garment sticking to the skin. Furthermore, the fibres used in the apparel transport moisture away from the skin to the outside of the garment to eliminate problems of dampness.

Odlo has a well-established seamless range of underwear with thinner zones for improved moisture management and breathability. Ribbed structures in the garment stabilise the garments whilst double weave zones retain warmth in the required areas designed for men, women, and children for different activities.

In its seamless products Odlo uses thinner material to improve the transport of moisture and the breathing activity, ribbed structures to give the garment more stability and the body exactly the right degree of hold where it needs it most, and

double fabrics to enable the creation of warmth retention zones.

Odlo has also collaborated with Italian textile producer, Eurojersey. Eurojersey spotted the demand for high performance fabrics for underwear back in 1989 when it introduced its patented warp knit fabric, Sensitive, that has been adopted by many big name producers in their underwear ranges.

Odlo offers different levels of insulation in its base layers.

 Odlo



Sensitive combines Meryl polyamide and Lycra elastomer to offer a lightweight fabric with the softness of knits, the look of wovens and the technology of warp knit materials, ideal for use in technical underwear. With two-way elasticity, Eurojersey's product also makes sewing easier and eliminates the curling effect, an important consideration when manufacturing lightweight small items such as underwear.

Due to its structure, Sensitive is breathable, does not trap perspiration, and is naturally anti-bacterial. It does not pill and, a very important factor in underwear, it is machine washable. It seems that this fabric has a great deal to offer and the fact that Eurojersey produces some nine million metres of Sensitive fabric every year for use in many types of garment from underwear to functional sportswear, it seems that garment producers, including Eurojersey's customers such as Marks and Spencer and Sloggi, are fairly convinced by its properties. Odlo saw the benefits of Eurojersey's fabric and decided to combine it with its seamless technology, using Bemis' tapes, to create its high performance underwear range.

But in the underwear industry of today, it seems that it is as much about the construction of the garment as it is the fabrics used to manufacture it. Just as everything in the world of communications is becoming wireless, it seems that for intimate apparel, the future is seamless.

According to US-based intimate apparel, activewear and swimwear manufacturer, Tefron, seamless garments are the fastest growing area in intimate apparel. Already boasting a 6% market share in the last five years, it could account for 50% of the industry's \$12 billion sales within a decade and with brands such as Ralph Lauren, Sara Lee Intimate Apparel, Tommy Hilfiger, Calvin Klein and Victoria's Secrets amongst its clients, it seems fair to say that Tefron is not alone in believing that seamless is the way forwards for the industry. At its knitting plant, in northern Israel, Tefron has installed over 800 automated machines of various kinds that produce both rib and single knits; CF machines that produce continuous fabrics with engineered textures; and cutting edge Santoni machines with rib features that produce virtually finished seamless garments from yarn, thus reducing labour whilst producing a higher quality garment with a better fit.

Bonding with technology

Bemis is a major manufacturer of thermoplastic adhesives, coatings, tapes and specialty film products with nearly 100 years of experience in the field, serving various markets throughout the world. Its products are specified in a number of industries for use in many different applications including apparel, automotive, composite panels, industrial labels, and woodworking.

The common thread between adhesives, coatings, specialty films and seam tape is that all of these Bemis products utilise thermoplastics.

In the apparel market, its adhesive films are used to bond various fabrics in many diverse applications from intimate apparel to technical outerwear garments and accessories. The company offers a wide range of adhesive forms from polyesters, polyurethanes, and polyolefins to nylons and vinyl coatings. It also works in embroidery and appliqué attachment, label attachment, seam construction, and fabric fusing. Bemis has perfected the extrusion process to provide the most advanced multi-layered films and tapes for this use.

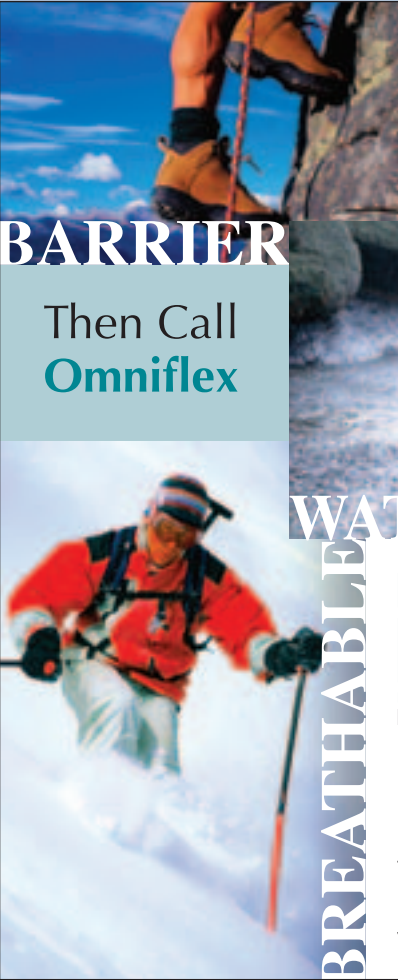
Intimate apparel, or underwear to the

rest of the world, was the original target when Bemis made its Sewfree adhesive films. Particularly important for undergarments is to have a smooth profile and low abrasion that are both helped by the Bemis technology.

Sewfree films eliminate bulky stitched seams and can improve the form, fit, and function of any design. Bemis supplies the adhesive chemistry, product innovation and industry experience needed to design and manufacture seamless garments. Sewfree is a soft, highly elastic, adhesive film designed for applications where stretch and recovery are required. It works with many materials including polyester, poly/cotton and blended fabrics.

In addition to the seamless appearance, another advantage that Sewfree offers in underwear and technical bodywear is weight reduction. In some designs a 15% reduction in weight can be realised compared with traditional stitching.

The system can bond open face materials such as laces, meshes and nets and you can see where future apparel design is headed. Bonded technology is being used in conjunction with existing cut-and-sew operations to create unique designs for less. Low cost new fabric and



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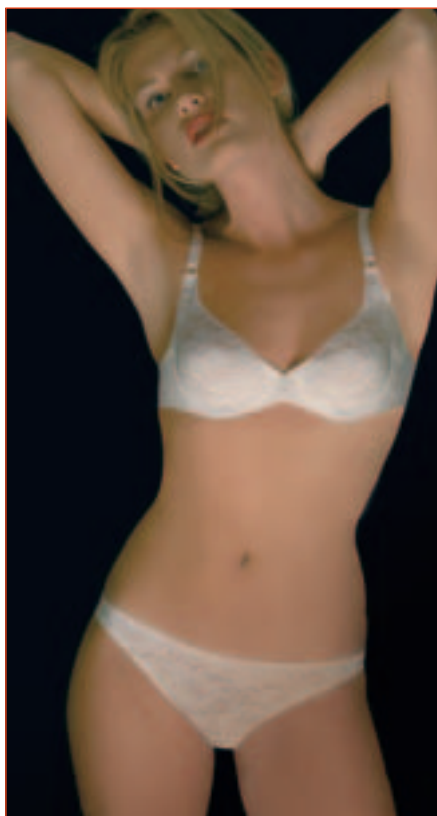
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Sewfree adhesive film is soft, lightweight and elastic making it ideal for undergarment and intimate apparel applications.



material combinations can now be achieved. Tubular fabrics can now be made truly seamless and the seams in apparel items such as bra cups and on control garments can be eliminated.

This continuous adhesive film technology is superior in many ways to the spray glues used in the past. Bonded garments manufactured with a continuous film can easily survive 50 wash cycles. Sewfree has a low modulus and high recovery offering superior stretch and improved 'grip'; it is non-yellowing, with a high melt point and viscosity ideal for moulding; it acts as an anti-fray component and can extend the life of the garment; it can be pre-applied to fabrics or on release paper allowing for greater manufacturing flexibility; and as a non-web adhesive it provides a secure bond over the entire seam, eliminating 'lifting' or delamination.

The challenge for designers today isn't the new technology rather it is their own imagination on the designs that can be achieved with it.

The advantages of using adhesive films in bodywear aren't entirely all design-related. With the ability to bond several components together in one step, a reduction in labour is apparent.

Not only are there fewer steps in making a bonded garment, there are also fewer components needed to construct some garments.

Brands and retailers who work with Bemis include Odlo and Marks and Spencer. Based on the success they have achieved in the intimate apparel market Bemis has now taken this new technology into the sports and outdoor market and are working with brands such as Columbia, Marmot and ArcTeryx.

A good yarn

Whilst Bemis' Sewfree technology offers multiple benefits, it still involves bonding two separate individual pieces of fabric, so while there may be no thread, there is still an overlap, or seam, however thin. Optimer has developed a new yarn to manufacture seamless bodywear. This new seamless technology works on the idea that the garment is knitted into shape, rather than knitting the cloth then assembling the garment, which allows manufacturers to map essential areas of seamless garments with the required features, including moisture management, ventilation/cooling, stretch and support. In Optimer's products, this seamless technology is teamed with the company's Dri-Release technology – a blend of synthetic (hydrophobic) and natural (hydrophilic) fibres – that accelerate the water release rate of wet fabric thus eliminating the wet, heavy feeling and skin chafing that can occur in humid conditions and protecting against hypothermia in cold, wet conditions.

Optimer worked in partnership with Memteks, a seamless garment producer with operations in Istanbul, Turkey and Virginia, USA in developing its seamless technology including its Dry&Seamless range – an advanced seamless garment that provides enhanced comfort. It is designed with a smooth finish that results in fewer pressure marks, chafing and pinching, which feels like a second skin. The major aspect of Dry&Seamless is that it is developed to keep the body cool and dry.

"Memteks is involved in the research and development of ultimate high performance seamless garments. We are very excited with the performance of Dri-release seamless. The Dri-release fibre produces technologically superior, longwearing activewear and intimate apparel seamless products. These products feature superior wicking and exceptional quick drying benefits. With minimum chafing, the seamless product doesn't rub the skin. The garments are smooth and

sleek with perfect fit and comfort," comments Yalcin Ozbey, president of Memteks USA.

Optimer has also worked in conjunction with Norwegian sports equipment and apparel manufacturer, Swix, which supplies the Norwegian and US XC ski teams. Swix has integrated Dri-release seamless technology with Optimer's FreshGuard odour neutraliser into its new range of lightweight functional bodywear for autumn 2005. The new range is made up of thirty-six different styles for men and women. The Extreme group within the range is a seamless Lycra group for high activity training that uses body mapping – a strategically engineered knitting technique that controls support and fit in specific areas of the garment.

So, it seems that seams – or the lack of them – are the future in intimate apparel. With consumers demanding ever-better fit and performance from their apparel, from the base layer outwards, it appears that whether a product is seamless or not is becoming as integral as moisture management, anti-bacterial and anti-odour properties when choosing intimate apparel. Whether garments are constructed using adhesive bonds such as those produced by Bemis, or 'seamless' fibres produced by Optimer, the days of the visible panty – or bra or boxer – line are definitely numbered. ☺



Swix Elite lightweight bodywear combines Dri-release seamless technology with Optimer's FreshGuard odour neutraliser.

