

Warp Preparation NEWS LETTER



Staying “in the black” through “green” production

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Incorporating Clariant’s “Advanced Denim” dyeing process into KARL MAYER’s Indig-0-Matic system – the perfect collaboration in terms of efficiency, flexibility and eco-friendliness

Influenced and invigorated by the global economic crisis, from 2011 onwards, the denim market will prove to be multifaceted, innovative and in a state of change. A clear trend reversal can be seen as far as these indigo-blue fabrics are concerned, which is away from traditional, mass-produced goods, the so-called “basics”, and towards high-fashion women’s and men’s wear.

This new diversity in jeans couture is making increasing demands on the quality, flexibility and cost effectiveness of production. In order to meet these growing performance requirements, the process designers, working in conjunction with the machine developers, are increasingly integrating the functions and

operations involved in the processing sequences of spinning – direct beaming/warping/assembling – sizing/dyeing into the weaving preparatory operations. This strategy has also helped the machine manufacturer, KARL MAYER, together with the products and processing techniques developed by the chemicals company, Clariant, to gain expertise on a global level. These two companies have combined their special knowledge of denim and, in so doing, have concentrated on integrating the conventional ring dyeing process. Conventional indigo dyeing, which is limited to a maximum of 6% dye fixing whilst taking into consideration adequate wash-fastness, is more important than ever nowadays. Clariant has

developed the environmentally friendly Diresul® RDT dyes and the innovative dyeing process known as Pad/Sizing-Ox for producing the typical denim colour. This new process enables ring dyeings to be produced in the style of conventionally dyed denim articles, but offers better dye fixing rates and a wider variety of colours. These factors have paved the way for using denim in avantgarde, high-fashion leisurewear, as opposed to its traditional use in workwear.

KARL MAYER was quick to spot the changes taking place on the denim market. This well-known, traditional company has strategically consolidated its "Warp Preparation" business unit (Fig. 1),

adapted its range of products, introduced new processes and technical solutions, and revamped and refined its existing systems. The result is the Indig-O-Matic machine system, an integrated, modular concept for the denim sector, which combines both traditional as well as ecologically optimised processing techniques.

KARL MAYER's Indig-O-Matic system, together with Clariant's Pad/Sizing-Ox dyeing process, provides the customer with a production system that is perfect for meeting the continuing market demand for smaller runs and for being able to react quickly to changing fashions.

Fig. 1: KARL MAYER's business units

1	Warp Knitting	Warp Preparation	Technical Textiles	Parts and Components
	<ul style="list-style-type: none"> ▪ Lace machines ▪ Tricot machines ▪ Raschel machines <p>For the production of</p> <ul style="list-style-type: none"> ▪ Rigid, elastic, and semitechnical fabrics ▪ Warpings for warp knitting 	<ul style="list-style-type: none"> ▪ Beaming machines ▪ Sectional warping machines ▪ Warp sampling machines ▪ Sizing machines ▪ Assembling machines ▪ Indigo dyeing range machine ▪ Creels 	<ul style="list-style-type: none"> ▪ Multiaxial machine ▪ Biaxial machine ▪ Weft insertion machine ▪ Stich bonding machine <p>For the production of:</p> <ul style="list-style-type: none"> ▪ Composites (fiber glass and carbon) ▪ Coated fabrics ▪ Nonwovens 	<ul style="list-style-type: none"> ▪ Wide range of Technologies ▪ Parts manufacturing ▪ CFRP competence

The Indig-O-Matic – a modular system with extremely efficient components

The modular design of the Indig-O-Matic combines the following components:

- the WarpLink (previously the BEN-LINK) system for fully automatic beam changing. The advantages of this system are that waste is reduced by about 50% when changing the sets, and it is also possible to process jobs having short running lengths of up to 10,000 m, without any loss of productivity.

- a system for rope and slasher dyeing based on a uniform process control system and machine philosophy.
- the VARIO DOUBLE modular dyeing machine (Fig. 2), which can be used flexibly for both conventional as well as nitrogen or reactor dyeing.
- a steamer (Fig. 3) with special entry and exit openings for avoiding water vapour clouds.
- a quick oxidation system for stabilising the climatic conditions during processing. The new generation of the QUICK OXIDATION

Fig. 2: The VARIO DOUBLE dyeing machine

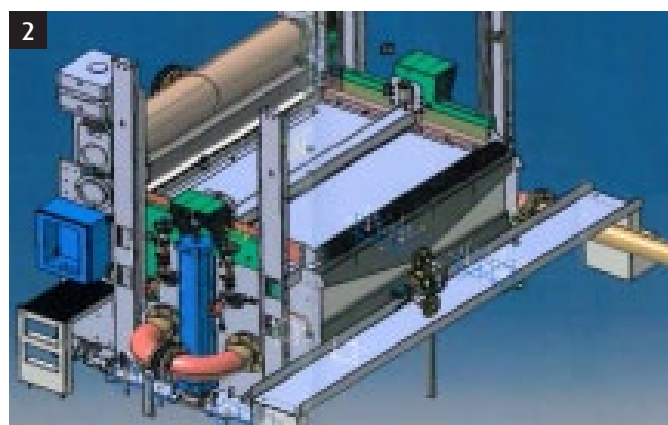


Fig. 3: The steamer



system reduces the length of the air passage by more than 30% and works according to the cross flow principle – a method which involves blowing air intensively at a constant temperature into the reaction zone. The result is a concentrated and completely uniform indigo oxidation, which improves fixing of the indigo pigment onto the yarn.

- the eco wash trough, which operates with roughly 10 – 15% less wash water than similar systems.
- the KAMCOS[®] control system, which accurately displays and optimally adjusts the elongation and tension values in every zone and for every processing stage in the machine. The customer can quickly spot any faults and weak places in the processing chain and deal with them efficiently.
- a completely automated chemicals kitchen and a measuring system for the indigo dyeing process.

All the process components and machines made by KARL MAYER operate extremely accurately and in perfect harmony with each other – the result of technical perfection! The material is fed accurately, reliably and compactly through the modules, and the state-of-the-art technical features guarantee optimum results. These include high-resolution, high-precision yarn tension measuring devices, yarn guides with conically tapered sides, guide rollers having a special grooved design, and a lifting roller system for equalising different yarn consumption values.

The yarns are handled gently by means of an accurate, continuous yarn guide control system, and the shortest possible, identical residual running lengths are guaranteed at the end of each batch. Warp beams having uniform working widths and homogeneous yarn volumes are produced extremely efficiently. KARL MAYER's production equipment also offers a high level of reproducibility and machine availability, and these performance features guarantee an exceptionally high level of efficiency when producing denim.

The Pad/Sizing-Ox system uses minimum resources for maximum results

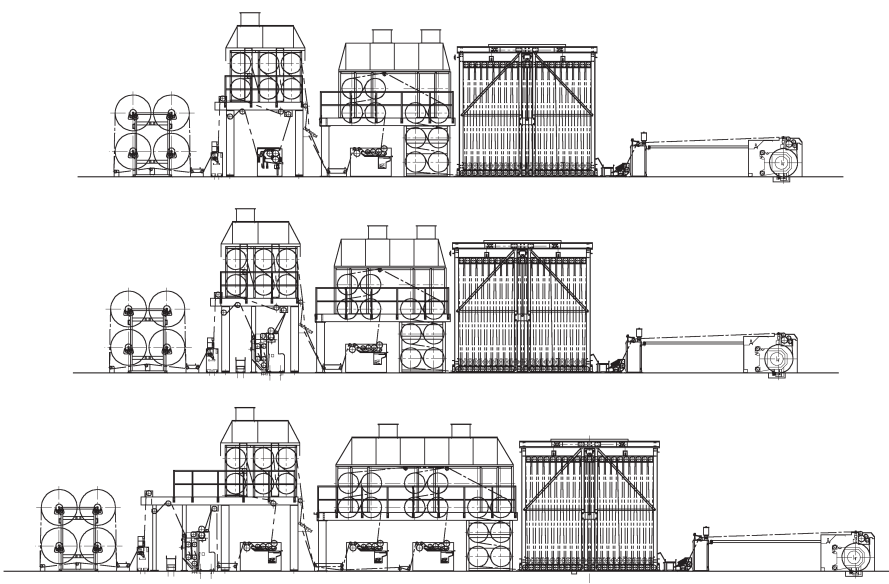
Clariant's Pad/Sizing-Ox system is a revolutionary denim process, in which the yarn can be dyed extremely efficiently and in an eco-friendly way in a sizing machine. This process is known as the "Advanced Denim" process and is based on a combination of Diresul[®] RDT liquid sulphur dyes and the new sizing auxiliary, Arkofil[®] DEN-FIX p. The use of Diresul[®] RDT creates

unique effects and produces a high colourfastness, accurate results and very good reproducibility of tones and shades when used in KARL MAYER's efficient VARIO DOUBLE dyeing system, for example.

Shade defects can be corrected easily and adjusted and stabilised very quickly. The colour can also be changed quickly and easily. New and interesting colours can be produced as well as deep blue, attractive grey shades and black, finely graded

Fig. 4: KARL MAYER's indigo sizing machine and the associated chemicals from Clariant

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The dyeing recipe:

- x g/l Diresul[®] RDT liq (only for Diresul[®] RDT liq)
- 7 – 10 g/l reducing agent D p
- 7 – 10 g/l Na OH 50 %
- 2 – 5 g/l Leonil[®] EH liq
- 2 – 3 g/l Ladiquest[®] 2005 liq
- Addition of the processing agents at 70 – 95 °C

The sizing/oxidation recipe:

- 6 – 8 % Arkofil[®] DEN-FIX p
- 0,2 % Trefix[®] MSW fla
- 2 – 3 % Diresul[®] Oxidant BRI liq

Setting the pH with Opticid[®] PSD liq to a value of 4.5 – 5
 Temperature of the size bath, 85 – 90 °C
 Moisture content after the size trough, 100 – 115 %.

shaded effects and special washed-out effects. The starting material for this is the raw yarn, which is supplied in the form of ropes or warps.

The Pad/Sizing-Ox also offers advantages when sizing using KARL MAYER machine technology (Fig. 4). These include good adhesion, a high water solubility, resistance to alkalis and high atmospheric humidity, an excellent size film and a high level of efficiency during subsequent processing on high-speed looms. The Pad/Sizing-Ox process also offers advantages for the environment, since the consumption of resources is greatly reduced throughout the entire process. At a batch load of 10,000 m of blue denim and an operating speed of 20 m/min,

the Indig-O-Matic can save 92 % of water compared to the slasher machine. Nor is any of this precious liquid used during dyeing. Furthermore, energy consumption is reduced by 30 % and cotton waste by 87 %. Virtually no effluent is produced. The Pad/Sizing-Ox can also produce washed-out effects without damaging the environment. The process operates using ozone or peroxide and consequently does not produce any harmful emissions containing hypochlorite or permanganate. All in all, the Pad/Sizing-Ox and Indig-O-Matic are two partners who are setting the trend in the textile sector – a partnership for whom the “chemistry” is just right.

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