

DILO MACHINES



HIGH SPEED NEEDLE LOOMS

Model series
DI-LOOM SC, SCB



SUPER NEEDLE LOOMS

Model series
DI-LOOM SX, SXB



▲ Needling line for spunbondeds DI-LOOM OD-II SX 60, DI-LOOM UD-II SX 60, DI-LOOM OD-II SX 60

HIGH SPEED NEEDLE LOOMS

Model Series DI-LOOM SC, SCB

SUPER NEEDLE LOOMS

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As the leading specialist DILO offers a complete production range for all needle looms with all working widths, stroke frequencies, needle densities and needling technologies.

There are applications for needling of heavy felts where high stroke frequencies are needed and high stitching forces arise.

By the very solid construction of the machine frame and the large number of eccentric modules supporting the needle beam the **DI-LOOM SX** model series meets this requirement. To provide highest security from vibrations the machine frame has been reinforced and stiffened to an even greater degree than the DI-LOOM S model series.

The SX model series is used especially for manufacturing heavy spunbondeds or heavy, multi-layer floor coverings.

The maximum stroke frequency of the DI-LOOM SX model series exceeds **2,200 strokes** per minute.

By using most recently developed composite materials for needle beam and needle board, the **DI-LOOM SC** model series allows a further increase of the maximum stroke frequency up to speeds of more than **3500 strokes** per minute. This also makes possible through-put speeds of up to about 100 m/min.

However, working at stroke frequencies exceeding 2,200 strokes per minute and with needle beams in stiffened light construction

can only be realized in combination with light to medium area weights. For both model series, DI-LOOM SX for high stroke frequencies and extremely heavy needle felts as well as DI-LOOM SC for highest stroke frequencies and light to medium needle felts, maximum functional safety is combined with lowest possible requirements for maintenance.

The DI-LOOM SX and SC model series comprise numerous types meeting all technological requirements. All **kinds of needling**, needling from top, from bottom or from both sides, with one, with two or with four needle boards.

The stripper plate has outlets in the direction of the material flow through which the fibre fly is able to pass easily to improve de-dusting by making use of the air flow caused by the needle beam. Upon request the needle looms of the DI-LOOM SX and SC model series may be equipped with a de-dusting device **DI-DUST** to prolong the cleaning intervals. As a special accessory the **quick release clamping system** is available for **stripper and stitching plates**, to improve accessibility for cleaning of the drillings.

For machines with two or more boards the penetration depth and stripper plate gaps may be adjusted individually. The final position is controlled electrically to avoid damage by displacement. Standard **working widths** range from 1.5 to 7 metres, rising in 0.5 metre increments.

Feeding system and pair of draw-off rollers are assemblies standing separately, which are fixed to the ground independently from the machine frame.



▲ DI-LOOM OD-II SC 25 working width ww = 2,5 m



▲ DI-LOOM UD-II SX 60 ww = 6,0 m



▲ DI-LOOM OD-II SC 46 ww = 4,6 m

They carry the safety guards which are closed mechanically and controlled electrically. The **safety guards** also serve to reduce the sound emission. The **pressure rollers** on pair of feeding rollers and pair of draw-off rollers are controlled pneumatically and can be adjusted precisely to the thickness of the material.

The needle loom itself is mounted on **spring elements** and vibration is not transmitted to the floor. The machine does not require any foundation and can be put onto the industrial floor.

The **needle beams** of the DI-LOOM SX machines are made of a high-strength, bending and torsion resistant aluminium profile. To avoid steps with differences in the penetration depth between parts of the needle board, which would result in tracking marks in the material, the needle beam consists of one piece up to a working width of 7 m.

The **pneumatic quick release clamping system** allows an exchange of the needle board within one minute, as it can be released and removed, sliding like a drawer. A positioning pin adjusts the board quickly and correctly so that the needles are centred towards the edge of the holes. Fast exchanges of the needle board avoid longer, cost intensive machine downtime.

The high-precision, solid **needle boards** consist of aluminium or a carbon fibre reinforced composite and polyamide. **Needle densities** range from 870 to 32,000 per metre of working width. DILO needle boards are available in small (200 mm) execution for the model series DI-LOOM SX, SC and in large (300 mm) execution for the model series DI-LOOM SXB, SCB. The maximum needle density of the small ALPA board is 5,000 needles per metre of working width, that of the wide board ALPA B is up to 8,000 needles per metre of working width.

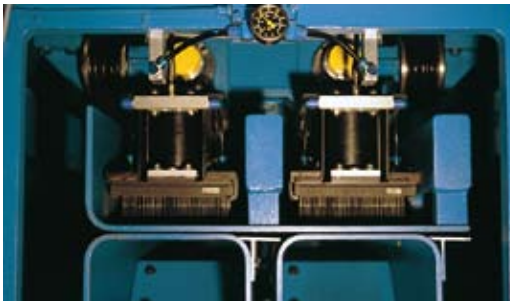
Small boards are lighter, easier to handle and capable of higher stroke frequencies. Wide boards are recommended e. g. when more than 5,000 needles/m/board are needed, waste fibres are needled and larger holes are required for cleaning reasons or when fibres of low tensile strength are needled, where too high a needle density would rather lead to a deterioration of the fibres. From a working width exceeding 2 m the needle boards usually are divided once. On request they can be divided into shorter parts when there is lack of space for longer boards.



▲ Modular main shaft system



▲ Rocker arm guiding



▲ Needling zone "Carbon fibre beam"

The machines of the DI-LOOM SX, SXB and DI-LOOM SC, SCB model series use **standardized elements and assemblies**, which are manufactured in large quantities and with ultra precision.

Two counter-rotating **main shafts** provide a nearly complete balancing of the rotating and oscillating masses. The main shafts are of modular design and consist of "**eccentric units**", which are connected by couplings and intermediate shafts.

The roller bearings of the main shaft, the main and crankshaft bearings are lubricated automatically. This **automatic lubrication** drastically minimizes the maintenance of the machines. The lubrication is controlled in a reliable way by four independent securing elements:

- the temperature control of the crankshaft bearings, which stops the machine as a precautionary measure when there is an undue increase of temperature,
- the electric control of the completion of the lubrication cycle,
- the electric control of the level of lubricant in the tank,
- the pressure control of the lubricant supply of the crankshaft bearings.

The mechanisms for needle beam drive, main shaft and connecting rods are separated completely from the needling zone and **sealed**.

The machines of the DI-LOOM SX and the DI-LOOM SC model series do not only have an **automatic lubrication**, but also have a so-called "**drainer**" for each eccentric bearing, which discharges the spent lubricant into an accumulating container within the housing of the module sealing the eccentric unit. From this deposit the lubricant can easily be removed once a year by means of a suction device (DILO accessory).

The **housing of the module** also provides excellent aerodynamics of the cooling air which very efficiently removes the heat from the eccentric bearings. Lowest running temperature of the bearings helps to preserve the quality of the lubricant as well as the lifetime of the bearings. Usually the cooling fans do not need any filter or radiator and, therefore, are nearly maintenance-free. The eccentric modules are small, light and can be exchanged quickly.

The needle beams are guided by the **DILO-rocker arms**. This unique guiding system only works with rolling and non-sliding movements. The functional surfaces are lubricated for lifetime, perfectly sealed and nearly free of wear and maintenance. The lower wrist pin bearings are also perfectly sealed. Lubricants cannot leak and fibre dusts cannot penetrate.

Stripper and stitching plate are adjusted by special **spindle-type jacks**, which are solidly clamped to avoid wear due to vibrations. These jacks are lubricated for lifetime. The final position is controlled electrically to avoid damage by displacement.

The optimised mechanics of Dilo machines are combined with the latest versions of reliable **electrical engineering and control electronics**. Speed controlled servo or A/C drives are used for feed rollers, draw-off rollers and needle beam. To facilitate feeding of material or exchanging needle boards, the **main drive** with four-quadrant control automatically positions the needle beam in top dead centre when stopping. Converter or servo electronics and PLC are installed in a separate switch cabinet.

The basic version controls and displays all machine parameters, recipe storage and messages with the aid of an MP277. All entries are controlled to be within the allowed limits and during inline operation speeds are cross-checked with other parameters.

Alternatively, a PC using the visualization software WinCC may be used. In this case operation is easier due to the mouse and more self explanatory. If this system is integrated in a complete line via industrial ethernet, and if more control stations are available, the line can be operated from any one station in case of failure. The recipe storage has access to the complete line and offers further possibilities. The analysis of errors is extended and it is possible to include this system in an intranet.

The device is integrated in an operator control desk, free of vibrations, and can be installed near the machine.

With the DI-LOOM SX, SXB and SC, SCB model series DILO has set a leading standard as regards performance, reliability, security and ease of operation combined with minimum maintenance.



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