

DORNIER A1 air-jet weaving machine for tire cord ...

Increasing volume requirements and also higher claims on safety and performance for vehicle tires have necessitated the development of a modern, high-speed and high-precision tire cord weaving machine. The special characteristics of cord fabrics for motor car tires, but also for bicycle tires and other applications, mean that they claim a special status among industrial fabrics. The DORNIER A1 air-jet weaving machine meets the requirements in a thoroughly convincing manner.



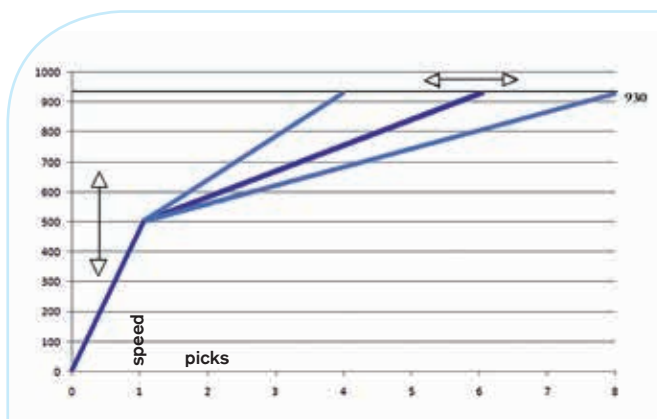
A1 air-jet weaving machine for tire cord

Main drive

The DORNIER tire cord air-jet weaving machine is set up on direct drive and delivered from the beginning with the programmable soft start, so that the machine starts at a pre-programmed low speed and accelerates over 3 to 10 seconds to the final machine speed. This reduces tension on peaks in the creel, especially with the heavy spools.

DORNIER ErgoWeave® with touchscreen

The software is operated via a spacious, user-friendly designed 15 inch touchscreen panel. Graphic representations of function cycles plus universally comprehensible symbols facilitate understanding of the selection possibilities. Direct access to important settings and to the electronically stored operating manual significantly reduces analysis time.



Softstart programmable to the requirement



Graphic designed user surface



Feed frame with warp supply

Warp and feed

The yarns delivered by the creel run into the feed frame upstream of the weaving machine. The feed frame can be equipped with a reed or expansion comb, the lease which keeps the cord yarns in the usual one-to-one pitch and a first warp stop motion or laser stop motion which detects any end breaks in the yarns arising from the creel.

A compensating roller is also provided here to ensure perfect synchronisation between the weaving machine and the creel.

Electronic Warp Let-off EWL

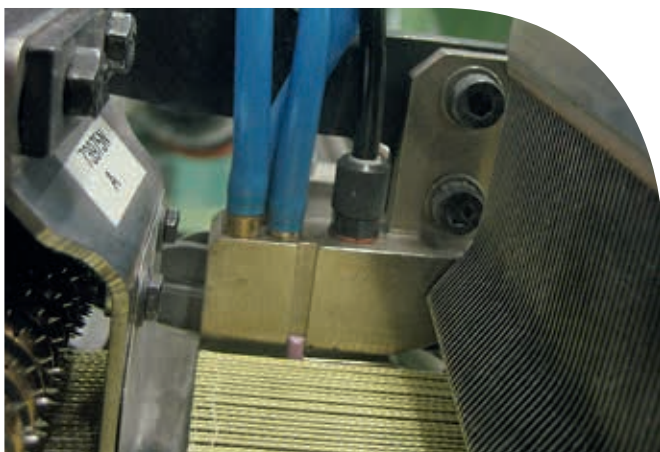
The generously dimensioned feed roll in the weaving machine is integrated in the Electronic Warp Let-off device, as a single unit in order to ensure that the cord material is fed to the weaving process slip-free and with precisely controlled tension by a S-sensor, regardless the pretension from the creel.

Shedding

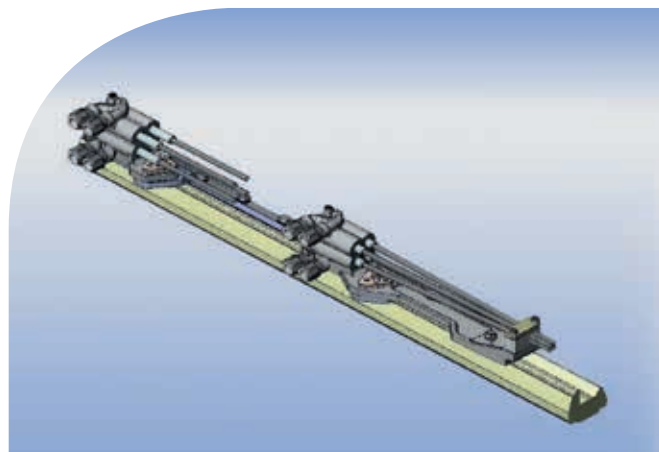
A robust cam motion with a 12 mm pitch is in use for shedding. This unit is able to satisfy the requirement for high yarn tensions coupled with smooth machine operation.

Selvedge formation

With DORNIER's pneumatic tuck-in unit, there is an air-jet weaving for increased performance limits. The pneumatic tuck-in device has no movable parts and therefore performs without increased maintenance or high spare part consumption. All settings are done while the machine is in operation, so perfect selvedge formations are easy to achieve. In addition to very reliable air tuck-in, DORNIER offers as an option a tuck-in selvedge control unit with different programming options and PDC connection for quality control.



Pneumatic tuck-in device



Tandem nozzles for an optimum performance

Filling insertion

The filling insertion system developed by DORNIER for its range of air-jet weaving machines is also being used for tire cord machines. The system is able to accommodate not only the usual cotton filling yarns in the count range from 20 to 33 tex, but also the high elastic Mehlerplast yarn and the coarse yarn for the tabbies. The APS system is implemented in the tire cord machine. The patented DORNIER PIC[®] system to monitor the valves includes as well the valves of the tuck-in device and secures the function of the system.

The new valve technology

Faster reaction times and less dead volume considerably decrease the air consumption of main, relay and stretching nozzles. With an option for two nozzles per valve, the air consumption of relay nozzles is additionally reduced and allows a more precise adjustment of the sequential nozzle group firing, resulting in a wider insertion window with a more gentle treatment of the filling thread.

High process reliability thanks to DORNIER PIC®

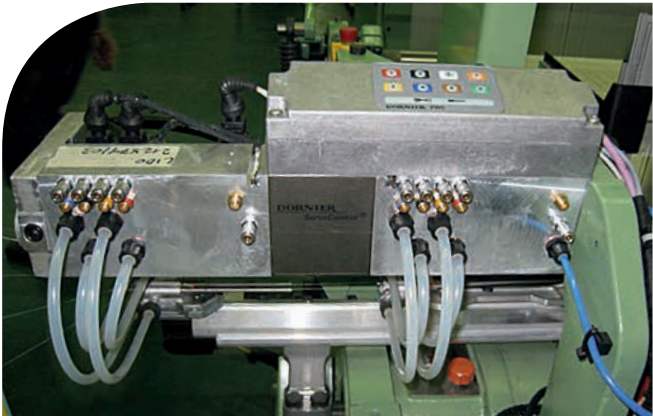
The patented DORNIER PIC® system (Permanent Insertion Control) recognizes any imprecise function of magnet valves right from the start and thus guarantees highest process reliability. The permanent control of the function timing of the relay nozzles with continuous comparison of set to actual values of the sequential nozzle group timing (on-condition monitoring) guarantees high quality of weaving and eliminates unnecessary stops for maintenance.



Single-hole relay nozzles

The compact throttle block with DORNIER ServoControl®-2

The patented DORNIER ServoControl®-2 system with integrated entry-pressure monitoring controls the air pressure in one common closed circuit for main and tandem nozzles in accordance with the pre-determined thread arrival times for each individual color. The pressure values are displayed digitally in absolute figures which increases the degree of automation and simplifies the reproducibility of article data. The compact design of the whole throttle block grants unobstructed view and free access to filling yarns and main nozzles. The semi-automatic filling threading for main and tandem nozzles is operated per push button and integrated into the throttle block, significantly simplifying the handling and reducing downtimes.



Throttle block for simple operation

Automatic tabby weaving

This is a standard feature of the DORNIER air-jet weaving machine for tire cord. For the tabby weaving process, the machine changes the filling yarn without stopping, increasing the pick density, warp tension and stretch nozzle pressure to the preset values. All the production-specific data of a batch, relating to the lengths and changes between cord and tabby weaving, are transferred together with the relevant settings by USB-stick or online from the computer to the weaving machine.

Electronic Cloth Take-up ECT

A triple roller assembly ensures that the take-up operation of the fabric is free from slipping and filling distortion. The required pick density is controlled by the Electronic Cloth Take-up device and can be freely programmed. Depending on the specification, the pick densities are between 4 and 15 picks/10 cm (1 to 5 picks/inch) for the cord and 30 to 120 picks/cm (12 to 50 picks/inch) for the tabbies.



Simple operation and handling of the batching device

Cloth wind-up device

A special batching technology is required to enable the inherently unstable cord fabric to be effectively wound. The main criteria in this aspect are, in particular, the hardness of wind, a flush-edge build-up and ensuring that the filling yarns in the fabric remain straight, i.e. free from distortion and skew. The weaving machine and the batcher are electronically synchronised and constant fabric tensions are ensured during all weaving processes even at standstill.

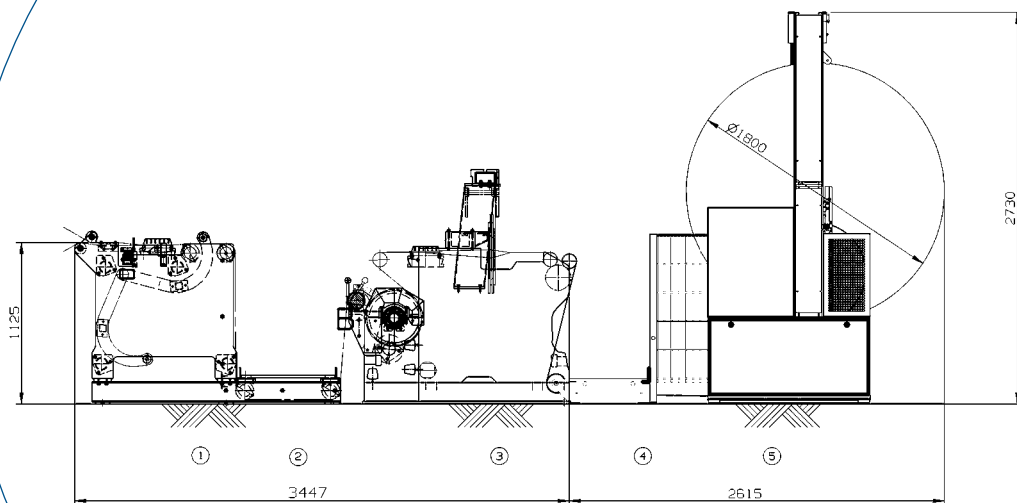
... is trimmed from A to Z for efficiency

Reduced maintenance needs

- DirectDrive and DORNIER SyncroDrive® drive systems without clutch-brake unit
- Maintenance-free single-hole relay nozzles
- Compact throttle block with stable arrangement of air-hose connections
- Pneumatic tuck-in without moving parts

Reduced set-up times

- Faster width changes
- Integrated speed control
- Effective reproducibility of electronic article data on settings
- Pneumatic tuck-in adjustable during operation



1. Cord take-in device
2. Weaver's platform
3. Weaving machine
4. Weaver's platform
5. Batch winder

Efficient and secure production

- Reduced manual time on filling stop repairs through compact throttle block
- Gentle insertion of delicate yarns and low tensile strength material
- DORNIER PIC® permanent monitoring of electronic filling insertion components including accumulator and pneumatic tuck-in

Reduced air consumption

- New valve technology with faster reaction times and reduced dead volumes
- New, faster DORNIER ServoControl®-2 with integrated monitoring of entry air pressure
- 2 relay nozzles per magnet valve
- DORNIER EcoValveControl® for air savings

Technical data

Machine type: AWSR 4/E D

Nominal width: 190 cm

Working width: 1,000 - 1,880 mm

Colors: 3 or 4

Shed formation: Cam motion

Number of heald frames: 2 or 4

Tuck-in unit: Pneumatic

Space requirement: 4,820 x 6,062 mm *

Speed: Tire cord up to 930 rpm **

Tabby approx. 400 - 500 rpm

Winding system: Batching device max. diameter 1,800 mm (2,000 mm on request)

* Feed frame, weaver's platform, weaving machine, weaver's platform and winder covered with 1,800 mm diameter batching device

** Dependent on yarn character and yarn count

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AIR-JET WEAVING MACHINE
FOR TIRE CORD

A 1