WINDER KL 1000 V

A. TECHNICAL DATA

Functional data

Paper grade: white and coloured papers, envelopes and directory grades

Basis weight:
- min. 30 lb/3000 ft²
- max. 70 lb/3000 ft²

Slitting width (set):
- max. 285"
- min. 268"

Drive speed:
Max. acceleration and deceleration: 8500 rpm
Emergency-stop deceleration: 260 rpm/s
Max. web tension: 5.0 pli

Core inner dia: 3", 5" and 10"
Core outer dia min.: 3.7"

Side of drive: left (seen in web running direction)

1. Unwind section

Max. machine reel:
- cross-machine adjustment:
  and oscillation: d 110" x 294"
  +/− 2", hydraulic, with machine reel width 290"

Locking of machine reel:
Locking of coupling:
hydraulic

Machine reel drive:
- web tension regulation:
- emergency-stop:
- parking brake:

Removal of empty reel spool:
hydraulically remotely-controlled lifting on removal rails

OPTION

Machine-reel change:
AUTOREEL
semiautomatic, without web splicing equipment
- overhead magazine for
2. Slitting section

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- Guide roll
  - vertical adjustment, ts.
  - stop brake

  d 29.5" x 297"
  +- 1", manual
  disk brake

- Slitting table
  - before and after
    - slitting
  - element diameter/length
  - element material

  rolls divided into elements
  in cross-machine direction
  6" / 40"
  anodized aluminium

- Slitters with positioning
  - system
    - number
    - top slitters
    - bottom slitters
    - on/off control
    - slitter-pressure
      regulation

  23 pairs
  d 7.5", tool steel
  d 10.0", tool steel
  pneumatic, remote-controlled
  pneumatic, common for all
  slitter pairs except edge
  slitters
  23 x 1.2 HP, inverter-
  controlled squirrel-gage
  motors

- slitter positioning
  - smallest slitting width

  SLITPOSIT, automatic slitter
  posit. system
  6.9"

- Trim chutes
  - trim width

  max. 4"
  min. 1"

- Spreading devices
  - before slitting
    - diameter/length
    - material

  roll divided into elements,
  with one adjusting screw
  6" / 10"
  anodized aluminium

- after slitting

  spreader tube over web and
  remote-controlled D-Bar
  spreader under web, adjusting
  interval 12"

- Web threading equipment

  web threading roller on guide
  roll, guide plates, air jets,
  web threading belts under drums
  and splicing air jets

- Web clamp

  web width bar on guide roll
3. Winding section

Max. completed set

Min. completed set

d 60"

d 14"

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Drums
-number
-grooving of 1st drum
-coating of 1st drum
-grooving of 2nd drum
-coating of 2nd drum
-stop brakes

d 33.5" x 295"

2 pcs

wide groove and deaeration grooving

tungsten carbide coated

ungrooved

tungsten carbide coated

pneumatic drum brakes

Rider roll equipment
-rider rolls
-relief
-vertical movement of rider roll
-roll diameter measurement
-safety lock

d 11.4", 4 sections

hydraulic, directly conn.

hydraulic

three-section pot. meter measuring roll position

pneumatically operated

catch locking

Core chucking equipment
-core locking

with hydraulically remote controlled core chucks

manual

hydraulic automatic control and relief

one pair for cores 3", 5" and 10"

-roll-width adjustment

-control of vertical movement

-core chucks

Roll barrier/
Nip guard

down going net guard between lowering cradle and drum

Roll lowering device

hydraulic lowering cradle

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Set change
(for cores 3" and 5", cores 10" manually)

AUTOCHANGE automatic core feeding, cutting equipment on roll ejector, web threading with air jets up to 60 lbs/3000 sqft (above this manual taping to core)

4. Controlling and adjusting equipment

Function control
-type

programmable logic

according to Valmet Paper Machinery Inc., Järvenpää Works component standard
WINDER KL 1000 V

B. EQUIPMENT DESCRIPTION

Valmet's KL1000 winder consists of the following sections:

1. Unwind Section
2. Slitting Section
3. Winding Section
4. Controlling and Adjusting Equipment
5. Guards

1. UNWIND SECTION

Unwind Stands

The unwind is designed for one reel spool width. The unwind stands are of steel construction. The machine reel spool is remotely locked in the stands with hydraulically operated locking arms.

Unwind stands are provided with spool kickout and storage rails. Hydraulically actuated arms lift the empty spool from the unwind saddles and allow the spool to be deposited on rails having shock absorbing bumper assemblies. A new parent roll may then be deposited into the unwind saddles by the house crane. The empty spool is removed from the storage rails by the house crane.

Cross-Machine Adjustment

The unwind stand is furnished with cross-machine adjustment. Through this adjustment, the web is centered for slitting so that the trim width is as required on both sides of the machine. The movement between the drive side and tending side stands is controlled through the reel spool. The cross-machine adjustment is accomplished by a hydraulic motor/gear jack system.

Oscillation

Top oscillation of the unwind is provided utilizing heavy duty anti-friction roller bearings located under the saddles. The back saddle is connected to a hydraulic oscillator and oscillation to the front saddle is provided through the reel spool. The oscillating stroke and speed are adjustable within the limits of the cross-machine movement.
Machine Reel Coupling

A remote controlled, hydraulically operated coupling on the drive shaft connects the machine-reel spool to the brake generator. In conjunction with the locking of the machine reel spool in the stands a crane hook stop connected to the coupling arm prevents the placing of the crane hook on the reel spool neck when the coupling is connected to the reel spool.

Emergency-Stop and Parking Brake

An air-cooled, hydraulically operated, disc brake is included that acts as a parking brake and as an auxiliary brake for the brake generator during "emergency" stopping.

Automatic Machine Reel Change System AUTOREEL, Without Web Splicing Equipment

The unwind stands are designed for receiving reels from the rails in the machine direction. (The reel rails with storage positions are not included.)

Removal of empty reel spools takes place with lifting arms up to the storage rails of empty reel spools.

The change system is initiated from the control desk. When the reel spool is nearly empty, it is disengaged from the brake generator and lifted up from the unwind with a set of transfer arms. A new machine reel is transferred from the storage position and connected to the brake generator. Cutting of the old web and splicing to new web is accomplished. The empty reel spool is lifted onto storage rails above the unwind stand.

(NOTE: Dimensioning of hydraulic unit is 3 x 40 HP pumps with AUTOREEL)

2. SLITTING SECTION

Frame

The slitting section is a modular, separate frame construction. The frame is of steel construction and the side frames are filled with a STONEHEART concrete mix for damping vibrations.
Guide Roll

The paper web is led from the unwind to the slitter section over a plain surface guide roll. This roll is furnished with an emergency-stop brake and is designed to be driven. The bearing housing on the tending side of the guide roll can be vertically adjusted with a ratchet wrench. This movement evens out the web tension in the cross-machine direction. The guide roll is dynamically balanced at a rotational speed corresponding to the design speed of the winder.

Slitter Table

The front and rear slitter table are assembled of freely rotating roll elements (sectional rolls) with individual bearing housings. The elements form a uniform roll, roll mounted, on a separate steel beam. Both ends of the beam rest on tension measuring sensors that measure the force directed from the web to the sectional roll row and transmit electric data about the tension to the DC drive.

Slitter Equipment

The paper is slit with rotating shear slitters. The bottom slit band and adapter are mounted on the shaft of the AC drive motor, and its counter slitlter is mounted on a separate top slitter holder. The top slitter holders are provided with pneumatic cylinder functions for on/off control of the slitters and slitter pressure.

Automatic Slitter Positioning System  SLITPOSIT

The SLITPOSIT slitter positioning system includes the equipment and the control system needed for automatic slitter positioning.

The desired roll widths are entered via the keyboard. When starting the slitter positioning the slitters automatically move into the new positions and are pneumatically locked in place. The positioning accuracy is \( \pm 0.3 \text{ mm} (0.012\text{"}) \).

After the positioning the measuring device moves across the machine and checks the slitter positions. The measuring accuracy is \( \pm 0.1 \text{ mm} (0.004\text{"}) \). If a slitter position is not within the preset tolerance, the system automatically repositions the slitter to the correct position. A similar repositioning can be done also after a slitter change.

The equipment has been designed so that slitter positioning can be done without cutting the web. The slitter carriages are locked to the transfer rods with pneumatic locking devices.
Trim Chutes

Trims are guided by support and guide plates into chutes located at the edge slitters, below the slitting section. The chutes and guide plates are designed so that the trim can freely fall in the chutes using only gravitational and steady-state forces. From the chute, the trim can be led through a suction system into a separate receiver, or it can freely fall downwards into a pulper or a corresponding receiver located directly below the chute.

Web Spreading Before Slitting

An element spreader roll is located between the lead-in guide roll and the before slitter table to insure that the web enters the slitting section uniformly tight and wrinkle-free. The roll bow can be adjusted with a handwheel/screw mechanism located in the middle of the roll beam.

Web Spreading and Separating Devices After Slitting

A remote-controlled D-Bar spreader is located below the web. The D-Bar bow either totally or locally can be adjusted with valves mounted on the roll barrier. These valves control the pressure in the pneumatic air-bags that through spindles adjust the D-Bar at each air-bag. The readout of regulators placed in connection with the valves indicate the actual D-Bar shape.

A bowed spreader tube is located above the web. Its purpose is to support the paper and to make the slit separation more effective. The tube bow direction is adjustable to even out the cross machine web tension. The adjustment takes place with a handwheel and a screw mechanism located on the tending side of the winder.

The D-Bar and the spreader tube are connected together in a way that allows spreading effect changes without causing any differences in web tension distribution.

Web Threading Equipment

The paper is threaded through the winder with guide plates, air jets and belts. The web threading devices are located in the middle of the winder. Web threading is accomplished when the winder is running at thread speed. The paper tail is torn wedge shaped on the machine reel and its tail is led into a nip between the guide roll and a web threading roller located on top of the roll.
The guide plates, air jets and the belts below the drums transport and lead the paper tail between the drums.

Web threading after a web break, around a set, takes place with splicing air jets. The on/off control of the web threading equipment is accomplished with pneumatic air-bags and cylinders.

3. WINDING SECTION

Frames

The winding section frames are of welded, box type, construction. The vertical frames are filled with STONEHEART concrete mix to minimize vibrations. The frames are provided with special steel guide rails for mounting of the rider roll.

Drums

The drums are of steel, thick wall construction. They are dynamically balanced at a rotational speed corresponding to the winder design speed. Both drums are equipped with stop/parking brakes.

Rider Roll Equipment

The rider roll consists of roll sections of lengths required for the machine width. The sections are mounted on a rider roll beam. The vertical movement of the beam is controlled with carriages which are supported on ground ways fastened to the frame. Both ends of the rider roll beam have drive motors that drive the rider roll through v-belts.

The rider roll beam is coupled to hydraulic cylinders fastened to the frame. Through these cylinders, the rider roll is moved up and down along the frame ways. During winding, the rider roll load is regulated with these cylinders. Smooth, low friction movement of the rider roll on the ways is achieved through use of anti-friction bearing units. The rider roll cylinders are a special, low friction, design.

The rider roll beam movement is synchronized with a shaft located on top of the beam, with gears at its ends and with racks located in the middle of the frame ways. Ratchet wheel style safety locks are mounted on the rider roll synchronizing shaft to prevent uncontrolled lowering of the rider roll. The ratchets are controlled with air cylinders.
Core Chucking Equipment

A set of hydraulic cylinders control locking of the cores in place. Another set of hydraulic cylinders control the vertical movement of the core chuck carriages. Roll width adjustment is accomplished through a handwheel/screw arrangement. The core chuck carriages are fastened to the rider roll ways through use of anti-friction bearing units.

Roll Barrier/Nip Guard

A sturdy roll barrier/nip guard acting as a safety device during winding is mounted between the drums and the lowering cradle. In the down position the barrier prevents rolls from being dislodged from the winder during the winding cycle and prevents operating personnel access to the ingoing nip. This makes it possible to run the winder when the lowering cradle is in its lower position.

Roll Lowering Cradle

A cradle mounted at floor level acts as a roll lowering device. The cradle is operated by hydraulic cylinders fastened to the frames.

Automatic Set Change System AUTOCHANGE
With Air Jets and Cutting Equipment

The automatic set change system includes equipment for feeding the cores, cutting the web and guiding the web tail around the cores.

A full width core trough is located on the roll ejector. The trough is fastened to a set of arms which pivot about the side plates of the roll ejector which pivot about the drum centerline. New cores are pushed into the trough during winding.

When the set is completed, the web holder which is located between the drums is lifted and pushed down against the rear drum. The roll ejector removes the completed set and at the same time the knife located at the roll ejector cuts the web. The trough with the cores rotates and feeds the cores between the drums. The roll ejector returns and the rider roll is lowered onto the cores. The web tail is guided around the cores with air jets located on the rider roll beam and under the drums.
4. CONTROLLING AND ADJUSTING EQUIPMENT

Control Desk

All control devices are installed in the control desk. The controls are grouped and provided with name labels for easy operation. Space has been reserved for the DC drive controls and customer supplied process controls. The control desk is fabricated of stainless steel.

PLC-Cabinet

The control logic is installed in a separate cabinet in connection with the electric equipment.

Rider Roll Relief

The directly suspended hydraulic rider roll is equipped with a feedback control system. The operator can choose between three (3) automatic loading functions or manual control with a selector switch.

Drum Current Ratio

For controlling the current ratio, the electric drive is given the customer roll diameter data through sensors indicating the rider roll position.

Tension Measurement

The slitter table is provided with sensors for measuring the web tension. The electronic tension measuring system delivers an electric signal to the DC drive for controlling web tension. The tension values can be set and followed from the control-desk.

Hydraulic and Pneumatic Equipment

The hydraulic unit is located separately from the winder frame. The hydraulic valves and other related equipment are fastened to their own valve stand.

The pneumatic valves and other related equipment have their own valve cabinet.

5. GUARDS

The winder is provided with a separate roll barrier/ nip guard.

The unwind section ends, drive shafts, couplings and brakes of the rolls as well as both ends of the lowering cradle are provided with guards.
The rider roll beam has a safety mechanism that prevents it from uncontrolled lowering.

Interlocks for insuring safety have also been built into the winder control program.