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TECHNICAL DESCRIPTION
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Super Duplex Compact 600 SL

MOD. 1500 (59")

NORDMECCANICA LAMINATOR

for solventless adhesives

LIST OF CONTENTS

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1. TECHNICAL DATA

1.1	Rated web width:	1500 mm (59")
1.2	Max. web width:	1520 mm (59.8")
1.2.1	Minimum web width (*):	550 mm (22") (*)
1.3	Unwind reel diameter:	**1270 mm (50")**
1.4	Unwind core diameter:	3" and 6"
1.5	Rewind reel diameter:	**1270 mm (50")**
1.6	Rewind core diameter:	6" only
1.7	Max. web tension:	
	- unwind	75 kg (750 N 165 lb)
	- rewind	90 kg (900 N 200 lb)
	In rewinding the taper tension can be regulated from min. 0% to max. 60% of the set value	
1.8	Min. web tension:	
	- unwind:	7 kg (50 N, 15 lb)
	- rewind:	9 kg (100 N, 20 lb)
1.9	Mechanical speed:	**600 m/min (1968 ft/min)**
1.9.1	Max automatic reel change speed	400 m/min (1312 ft/min)
1.10	Machine colour:	WHITE RAL 9001
1.10.1	Electric cabinet colour	RAL 7035
1.10.2	Colour of control panels	RAL 7035
1.11	Machine direction:	from left to right

1.12 **Environmental working conditions**

EN 60 204-1 P.4.4.2

Non-operational environmental conditions required

Temperature:	from +1°C till +50°C (34 to 122 °F)
Max humidity:	95% without condensate

Operational environmental conditions required

Temperature:	from +10°C to 40°C (50 to 104 °F)
Humidity:	from 30 to 95% without condensate
Altitude:	Max altitude allowed 1000 m/SL (3300" ASL)

1.13 **Noise level** 85 dBA (following ISO 11202)

Measured setting to zero the influence of background noise. In the measure it is not included the noise level generated by ancillary equipments.

(*) Subject to compliance with machine tension range.

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2. LIST OF SUBSTRATES TO BE PROCESSED (*)

COATED WEB	Thickness in metrics	Thickness in Imperials
BOPP	20 - 80 µ	.8 – 3.15 mil
PETP	15 - 30 µ	.6 – 1.18 mil
LDPE, LLDPE	50 - 200 µ	2 – 7.87 mil
OPA	15 - 18 µ	.6 - .7 mil
NYLON CAST	50 - 80 µ	2 – 3.15 mil
ALU (Foil)	9 - 40 µ	.000354" - .002"
PP CAST	60 - 150 µ	2.36 – 6.0 mil
PAPER	40 - 180 gr/m2	25 – 110 ppr

LAMINATED WEB	Thickness in metrics	Thickness in Imperials
BOPP	20 - 80 µ	.8 – 3.15 mil
PETP	12 - 30 µ	.5 – 1.18 mil
LDPE, LLDPE	40 - 200 µ	1.6 – 7.87 mil
OPA	15 - 18 µ	.6 - .7 mil
NYLON CAST	30 - 80 µ	.8 – 3.15 mil
ALU (Foil)	9 - 40 µ	.000354" - .002"
PP CAST	30 - 150 µ	1.2 – 6.0 mil
COEX FILM	30 - 200 µ	1.2– 7.87 mil
PAPER	40 - 180 gr/m2	25 – 110 ppr

* ***This list is to be used for general reference only.***

The minimum and maximum thicknesses that can be processed refer to materials having standard characteristics. However, it is very important to underline that substrates listed can be processed in the tension range mentioned on page 3.

This machine allows easy and accurate setting for all variables involved. It is anyway understood that operator experience will be needed to select, among all settings combinations, the one that will optimize the lamination results.

IMPORTANT NOTICE: all substrates intended to have a minimum level of surface treatment of 38 DIN when processed. With lower values the final quality of lamination is not guaranteed.

3. SERVICE REQUIREMENTS / EXHAUST

Super Duplex Compact

- voltage: 3 x 480 V 60 Hz without neutral to be confirmed
- installed power – indicative: 100 kW
- max. absorbed current – indicative: 150 A
- main switch – indicative: 160 A
- capacity – indicative: 40 kA

Compressed air

- air quality: dry – not degreased
- pressure: 6 - 10 bar (87 to 145 PSI)
- consumption: 100 l/min (22 gal/min)
- line: one line 1/2"

Water supply

Heating unit

- pressure: 2 ÷ 5 bar (29÷72 PSI)
- hardness: 7÷15° French (60 mgCa)
- consumption while cooling: 660 l/h (174 gal/h)
- pipe size: 1”

Chilling roller

- pressure: 2,5 ÷ 5 bar (32÷72 PSI)
- hardness: 7÷15° French (60 mgCa)
- temperature: 15 - 20°C (59÷68 PSI)
- difference of temperature: 4°C (40 F)
- difference of pressure: 2,5 bar (26 PSI)
- consumption: 2000 l/h (530 gal/h)
- single line: 1"

Exhaust

Adhesive fume exhaust

- quantity of ventilators: 1
- air quantity: 4,500 m3/h (2648 cfm)
- size of line connections see relevant drawing

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4. MACHINE DESCRIPTION

Super Duplex Compact SL is the "state of the art" in the two layers SL configuration. It is the unmatched solution for coating and laminating at the top of quality and productive performances using SL adhesives. Lay-out is developed to minimize web path through the machine.

The configuration for this Order confirmation includes:

- **1 coating section equipped with:**
  - **Solvent free adhesives coating head.**
- **1 laminating section.**
- **2 Non-Stop Turret unwinds reel O.D. 1270 mm (50").**
- **1 Non-Stop Turret rewind reel O.D. 1270 mm (50").**

4.1 Foundation and general structure

The laminator is positioned on steel plates, built into the floor, in order to uniformly distribute the weight of the various components of the machine.
Each section can be leveled by means of register screws.
Nordmeccanica will supply foundation drawings indicating locations for the plates.
All machine sections are built using steel made side frames properly sized.
All idle rollers are aluminum made, dynamically balanced, assembled on low friction bearings to reduce influence of passive inertia on web tension.
All Nordmeccanica products are Made in Italy using mechanical parts Made in Italy in Western Europe and in North America. All components supplied by Industry leaders in the relevant technology.

4.2 2 Turret Non-Stop unwinds with automatic two-way reel splice Max reel diameter 1270 mm (50")

The unwind has the following features.

Steel side-frames linked together by steel cross-bars, properly dimensioned.

The turret type reel carrier group consists of a rotating supporting structure with two couples of chucks housing the reel shafts. Chucks are manually-pneumatically operated.

The unwind tension is controlled by two AC vector motors, one for each reel, controlled by vectorial drives. The control of the motors (full regenerative) is at 4-quadrant.

The read-out of a pneum-electronic dancer roller feeds the tension control software so to guarantee most accurate unwind web tension control. The tension read out is also visualized on a digital display and on the screen of the supervisor system in Kg, N. or Pound.
FIFE web guide equipment controls the shifting of the unwind for the alignment of the web. Supply includes ultrasonic sensors reading the edge of the web. The max. sideways alignment of this web guide is +/- 50mm.

Unwind is prepared for the installation of Corona treatment. In case of installation Corona treater must be motorized.
Corona treaters are intended for refreshment use only; please refer to note in chapter 2.

Splice procedure. The reel splice procedure is activated by the operator. Steps are as to follow: the turret moves the reel from the load/unload position to the splice position; rotation of the new reel is now activated, controlled via an encoder, to reach the machine speed; the operator button will flash to inform that the splice is now possible; until operator approval, splice will not be performed. The system will in any case stop the machine before loosing the web, if operator approval will not be released.
Automatic splicing can be operated in both unwinding directions.

Unwind data:

Max. reel diameter	**1.270 mm. (50")**
Min. diameter for automatic splice:	400 mm (15.7")
Max. tension:	60 kg. (600 N-130 lb)
Min. tension:	6 kg. (60 N-13 lb)
Max. web width:	**1520 mm (59.8")**
Min. web width:	**550 mm (22")(*)**
Max. reel weight:	**1.500 kg**. (3307 lb)

(*) Subject to compliance with machine tension range.

At reels flying splice machine will automatically slow down to 400 m/min. After the splicing procedure speed will be automatically brought back to the original set value.

4.3 1 Turret Non-Stop rewind with automatic two-way reel splice Max reel diameter 1270 mm

The rewind has the following features:

Steel side-frames linked together by steel cross-bars, properly dimensioned.

The turret type reel carrier group consists of a rotating supporting structure with two couples of chucks housing the reel shafts. Chucks are manually-pneumatically operated.

The rewind tension is controlled by two AC vector motors, one for each reel, controlled by vectorial drives. The control of the motors (full regenerative) is at 4-quadrant.

The read-out of a pneum-electronic dancer roller feeds the tension control software so to guarantee most accurate rewind web tension control. The tension read out is also visualized on a digital display and on the screen of the supervisor system in kg or in N. Tension can be operated in Taper mode up to a total percentage of 60% of the nominal set value.

Lay-on roller is included. The roller pressure is operated via two pneumatic pistons with independent control.
The change of position of the lay-on roller during flying splice from one reel to the other can be manually or automatically selected.

Splice procedure. The reel splice procedure is activated by the operator. Steps are as to follow: the turret moves the reel from the load/unload position to the splice position; rotation of the new core is now activated, controlled via an encoder, to reach the machine speed; the operator button will flash to inform that the splice is now possible; until operator approval, splice will not be performed. The system will in any case stop the machine, if operator approval will not be released in a suitable time.
Automatic splicing can be operated in both rewinding directions.

Rewind data:

Max. diameter reel	**1.270 mm (50")**
Max. tension:	70 Kg. (700 N-154 lb)
Min. tension:	7 Kg. (70 N-15 lb)
Max. % of taper tension:	60%
Max. web width:	**1520 mm (59.8")**
Min. web width:	**550 mm (22") (*)**
Max. reel weight:	**1.500 Kg.** (3307 lb)

(*) Subject to compliance with machine tension range.

At reels flying splice machine will automatically slow down to 400 m/min.
After the splicing procedure speed will be automatically brought back to the original set value.

4.4 Coating and laminating section "Compact SL"

Machine lay out is developed so to house, in one only section, both the coating unit and the laminating unit. With this configuration it is reduced to minimum the web path trough the machine.

4.4.1 Coating

Includes:

- **Steel structure**
- **Solvent Free adhesive coating head:** see description to follow (at the relevant paragraph).
- **Pressure roller**
- **Pre-heating calander** for the coated web. It is steel made, chromed, with rotating couplings for water circulation. It is motorized through the laminating unit AC motor. It is installed before the coating nip.
- **Misalignable roller**: the misalignable idle roller is used to adjust the distribution of tension across the entire web width in case of imperfections of the coated web. It is installed before the coating unit.

- **Totally enclosed safety protection:** the entire section is protected by means of safety guards, as a totally enclosed volume, with sliding doors for easy access, allowing visual inspection by means of safety glasses. All access doors are protected by interlocked safety micro-switches. The enclosure is developed to guarantee active safety protection as well as a "plenum" to allow the efficient **exhaust of adhesive vapors** from the coating section. Blower and exhauster system are included.

4.4.1.1 Solventless coating unit (E.P. Pat. No. 0324892)

Layout

The solventless coating unit is Nordmeccanica 5-roll system:

Roll A: coating
Roll B: carrier
Rolls C and D: metering
Roll E: pressure

Rolls C and D performs the first calibration of adhesive quantity, are chromium plated steel double wall with forced spiral water circulation for temperature control. Max working temperature 95° C.

Roll B is rubber coated and has to be sized to the coated web width. It slides along two side guides in a 45° angle, so to allow, with high accuracy, the automatic control of the thickness of the adhesive layer, in the play of the positioning of this roller in respect of rollers A and C. This roller is positioned by means of two pneumatic pistons with adjustable pressure. It is included in the supply an expressly developed trolley for quick handling in and out of the station this roll.

Roll A performs the last and more accurate calibration of the coating weight and provides the final coating onto the web. Is chromium plated steel made with dual chamber system for water circulation as for rollers C and D.

Roller E is the rubber counter impression roller.

Motorization

Roll A is driven by the main coating section AC motor, this is a Vector motor controlled by fully regenerative 4-quadrant vector drive. This roller runs at the machine speed as set by the operator.

Rolls B and C are driven through a gear box by a vector AC motor controlled by a regenerative 4-quadrant vector drive.

Roll D is not turning during production run. This roller can be rotated only for cleaning and maintenance needs.

Metering/adhesive transfer

The adhesive feeding to the coating unit is performed through the heated hose (*) of the mixing unit. The delivery head of the hose is fixed on a shifting dispenser that provides an even distribution of the freshly mixed adhesive.

The gap between rolls D and C gives a first rough metering of the adhesive. It is the only gap manually adjustable. It's operated by means of micrometric screws.
The adhesive in between rollers C and D is sideways contained by a set of two Teflon dams positioned crossway in function of the coating width.

A proximity sensor controls the level of the adhesive and is connected to the mixing unit.

The final thickness of the coated adhesive, in function of the elected coating weight is achieved in the play of speeds and gaps of the three rollers B, C and A.

*(*) Valid only for **World Mixer** or mixing units equipped with this feature.*

4.4.2 Laminating section

Includes:

- **Steel structure**
- **Laminating unit**: three rollers type:
  - *Steel chromium plated laminating roll*, double wall construction with a multiple spiral inside, for the circulation of the water controlling the roller temperature. It is driven by a vectorial A.C. motor.
  - *Rubber pressure roll* of small diameter in order to reduce the contact area of the lamination nip so to increase the laminating pressure.
  - *Steel supporting roller* for the rubber pressure roller. This roller is used to back up the rubber pressure roller so to avoid deflections. This roller is equipped with dual independent pneumatic adjustment of the pressure.
- **Pre-heating calander** for the secondary web. It is steel made and it is provided with rotating couplings for water circulation. It is motorized through the laminating unit AC motor. It is installed before the laminating nip.
- **Chill roller:** steel made chromium plated and provided with rotating couplings for water circulation. Motorization is by means of timing belt connection to the lamination unit motor. Chill roller is located after the lamination nip.
- **Misalignable roller**: the misalignable idle roller is used to adjust the distribution of tension across the entire web width in case of imperfections of the secondary web. It is installed before the lamination nip.
- **Exhaust system**: Exhaust is provided by means of the same blower used for the coating unit.

4.4.3 Overhead structure

Web support between sections of the laminator is provided by means of a set of aluminum made, hardened surface, dynamically balanced idle rollers. Idle rollers are assemblied in a steel frame structure, overhead connecting: unwinds rewind and the coating/laminating section.

4.5 Electric heating units for temperature conditioned rollers

Units are required for the temperature control of the laminating unit, the pre-heating calanders and the solventless metering and coating rollers.

The laminating station includes:
1 heating (*) unit for the laminating roller
1 heating (*) unit for the pre-heating calander (secondary web)
(*) Unit is equipped with heat exchanger for temperature stabilization.

The Solventless coating unit includes:
1 heating (*) unit for the SL coating roller
1 heating (*) unit for the SL metering rollers
1 heating (*) unit for the pre-heating calander (primary web)

(*) Units are equipped with heat exchanger for temperature stabilization.

4.6 Electric equipment

- Main electric cabinet positioned on the non-operator side of the machine. DC-Bus type power feeding technology of vector drives. A UPS unit, included in the supply, will protect all critical functions (data and signals) so to guarantee quick restart under longer power failures conditions.
- Spike protection and harmonic protection.
- Digital control logic of the machine housed on Siemens industrial PC.
- Electric cabinet structure according to: UL.
- Option: electric cabinet "NM CONTAINER" type with floating floor, thermoconditioned temperature, walk in structure (max. distance from the machine: 3 mt)
- All Nordmeccanica products comes with: **UL Certification: NITW.E301580.**

System includes:
- Supervisor system "Nordmeccanica Syntesis" installed on the PC of the machine (see full description at the relevant paragraph).
- Control panels on each main group of the machine, operator side, with pushbuttons ergonomically positioned. Main control panel with Supervisor interface located on a pulpit in the operator area of the machine.
- Drives, vector AC motors controlled by fully regenerative 4-quadrants vector drives.
- All vectorial AC motors are feed by DC/AC convertors connected on a single DC Bus and through a single net feeder.
  This system enables to optimize the quantity of energy used during the unwind braking, with a net recovery (DC Bus). It is also optimized the ratio between the entry line tension and the DC line tension, in order to save energy without compromising the motorization power of the machine.
- Programmable logic system for machine functions control.
- UPS system.
- Web-brake detector.

4.7 Supervisor System "Nordmeccanica Syntesis"

"Nordmeccanica Syntesis" is a supervisor system allowing the control of all parameters and of functioning of the machine, software is installed on a Siemens industrial PC (processor: industrial Pentium®) with operative system WINDOWS XP Professional SP2® all reading and settings are performed through a "touch screen" color display 15" TFT SVGA.

Approach to the supervisor, for the operator, is simple and intuitive. Following menus are accessible from the main menu page:

4.7.1 Production Management

Allows to set parameters for the identification of the operator and the identification of: shift, production order, net production required.

4.7.2 Recepies

This function allows to set variables connected to a specific job, memorize and recall. Variables managed:

Job Identification Data:

a. Customer name
b. Article code
c. Order number
d. Job number
e. Type, length and thickness of the substrates to be laminated/coated
f. Adhesive/coating type

Set values:

a. Programmed Machine speed
b. % speed of the dosing roller (coating weight set)
c. Tension values
d. Quantity (in length) to be produced
e. Quantity (in length) produced

4.7.3 Reel management

This feature allows to set and store data connected to the specific reel in production; it is developed for needs connected with Quality control, Product tracking etc.

Variables involved are:

a. Measured machine speed.
b. Measured tension in the various machine sections.
c. Taper tension %.
d. Total programmed length for the actual job.
e. Total rewound length per reel.
f. Total produced length for the actual production order.
g. Two dimension graph speed/time.
h. Min and Max set diameter for each reel.
i. Actual diameter for each reel.
j. Input of defect description for the rewinding reel.

4.7.4 Alarms

This function notifies the operator with alarms messages generated by the system. Managed alarms are those connected with safety (such as open guards) as well as those generated by deviations of the variables from the values selected in the recepy. Self-diagnosis of the system will also generate alarms.

4.7.5 Machine Stop Descriptions

The system provides a description for every machine stop. Descriptions are of two natures: description of stops requested by the operator and descriptions of stops generated by the System. 32 variables are monitored and timer controlled.

4.7.6 Statistics

The system allows to generate statistic views for some of the managed variables.

4.7.7 Trends

This function will generate graphs of the run of managed variables during production.

4.7.8 Synoptic

This function will present on the screen a schematic of machine lay out and webbing. On the screen also shows: set values and actual values of the following variables:

a. Motors status
b. Temperatures
c. Tensions
d. Actual machine speed
e. Actual Reel Diameter

4.7.9 Report

This function allows storing data in Windows® format (Excel®) to be exported or printed on the local printer.

4.7.10 Maintenance Management

This function allows programming the scheduled maintenance. The system will indicate the maintenance dead lines, as indicated in the "User and Maintenance Manual" for a number of items, each of them monitored by separate clock. This function is only accessible, under password, by the Maintenance Supervisor.

4.7.11 Help on line

Help on line is visualized on screen as an Acrobat Reader® copy of the "User Manual".

4.7.12 Setup

This function allows the setting of the manageable variables included in the system such as: tension, minimum and maximum selected diameter for each reel. It is also visualized the actual diameter of all reels.

4.7.13 Network connection

Supervisor system protocol allows the connection to a network featuring the same protocol. That's to say that the synoptic screen of the system can be remotely displayed (visualization and print only) on a computer connected to the network so to give a remote view of the working status of the machine.

Note: Needed hardware (wire, plugs etc.) and engineering supervision not included. Resident network protocol and connection parameters need to be submitted to Nordmeccanica for explicit approval.

4.8 Safety Protections

- Machine is developed respecting the most stringent safety regulations.
- For electric equipment please refer to the relevant chapter.
- All of rotating mechanisms and gears are protected by safety guards, all door access protected by means of interlocked safety micro-switches.

4.9 Teleservice S7

This function provides remote check and control. Allows the connection to the Nordmeccanica Service (*). By means of a modem the Nordmeccanica Service will be able to connect to the CPU and Drives of the machine.
It will be possible, in real time, to perform service assistance on software related anomalies detected in the functioning of the machine, as well as perform diagnosis of other related anomalies.

In order to allow the installation of this system the customer will make available a preferential telephone line PSTN (by-passing the telephone exchange) and only dedicated to this use, with a terminal connection located next to the main cabinet of the machine. To the line it will not be connected any other device (i.e. telephones, faxes, other modems).

Hardware for TELESERVICE S7 is a modem and a TS adapter (interface modem-PLC).

(*) Available service points:
- Nordmeccanica, Piacenza Italy.
- Nordmeccanica NA, NY USA.

4.10 Measurements units and language

Machine language will be English (labels, stickers, HMI, manuals). All measurements units will be Imperial (fpm; PSI; lb; Fahrenheit).

4.11 Machine equipment

ITEM	EQUIPMENT	(A) STANDARD	(B) EXTRA	Total (A)+(B)
1	Pressure roller for coating unit.	1+1(*)		2
2	Pre-heating calander before lamination	1		1
3	Pre-heating calander before coating	1		1
4	Chill Roller after lamination	1		1
5	Pressure roller for laminating unit	1+1(*)		2
6	Heating unit for laminating section.	2(*)		2
7	Heating unit for S.L. coating station.	3(*)		3
8	**Transfer Cylinder trolley for the S.L. coating station.**	1(*)	1	2
9	Shifting dispenser for the S.L. coating station.	1(*)		1
10	**Rubber coated transfer cylinders for the S.L. station.**	1+4(*)	20	25
11	Roll store stand for up to 18 Transfer Cylinders for S.L. station.	1(*)		1
12	Foot switch to simplify cleaning of the S.L. station.	1		1
13	FIFE shifting edge-guide system on all unwinds.	2(*)		2
14	Expanding shaft for cores I.D. 3" – 76 mm	4		4
15	Expanding shaft for cores I.D. 6" – 152 mm	2(*)		2
16	**Electronic Trolley for reel handling (max.1500 kg)**	1(*)	1	2
17	Predisposition to install Corona treater on each unwind.	2(*)		2
18	Supervisor system "Nordmeccanica Syntesis"	1(*)		1
19	Teleservice S7	1(*)		1
20	Set of lamps for machine lighting.	1(*)		1
21	Tool box	1		1
22	Spare Part Set with electronic, pneumatic and mechanical components.	1(*)		1
23	Manuals and documentation of the machine according to the USA regulations	1		1
24	**Luraflex distension roller for paper before coating and before lamination nip**		2	2

(*) Quantities marked with an (*) are included in the supply as additional equipment.

4.12 Also included in the supply.

ITEM	DESCRIPTION	QUANTITY
1	**Wagner Colora Mono-component Adhesive Extruder (Pump) Set for 200L drums (MOD. EM 31-235), (single drum set), with the following features:** ○ Flow rate 235 cc per cycle ○ Pressure ratio 31 : 1 • Max. Flow : **1600 cc/min** (42 gall/min), about (in accordance with the type od the adhesive, product and room temperature 25°C – 77°F) • Heated follower plate in aluminium casting with single NBR seal • Air powered double post ram PP200 • Depressurization device for pneumatic motor activated by off signal of product valve • Alarm device for product run-out, with acoustic warning and motor pump stop • 1/2" ball valve with pneumatic actuator of the product hose (double effect) • Pneumatic piloting system for product valve • Drum air feeding device for plate lift, hollow rod type, complete with safety valve to limit the pressurization in the drum itself • Two ½" delivery hoses – 7,5 MT (295") length – operating pressure 150 BAR, electric heated (max temperature 100°C – 212°F) and complete with connectors placed at the pipes ends • Electric panel for power and control of the heated hose and inductor plate temperature. The setting of the relevant temperatures is controlled by electronic thermoregulator. Heating elements are 24V powered. • Tank central positioning and locking device • Electrical supply 480 V • Power 2760 W • Panel complete with voltage transformer to 480 V. 60 Hz. • **<u>Unit complies with CE rules and specifications.</u>**	**1**

2	**Motorization for Corona treater** Motorization of corona treaters is recommended so to improve quality of tension control. Motorization and integration with machine electronics is at Nordmeccanica care. The package for the motorization of corona treaters will include, for each unit: ❑ Push, web tension indicator and adjustment devices. ❑ Aluminum idle rollers for proper webbing. ❑ Load cell or dancer roller for tension sensing after the treater nip. ❑ Alteration to the supervisor system to accommodate information on tension for the new section. ❑ Vectorial A.C. motor with belts and pulleys for treater roll motorization. ❑ Vectorial drive for the AC motor.	**1**