LET'S ROLL!

ROLL COVERS AND SERVICES FOR THE PAPER INDUSTRY



At Hannecard Group, you are guaranteed a top-notch service thanks to:

120 YEARS OF EXPERIENCE

TOP-QUALITY, HIGH-TECH PRODUCTS AND SERVICES

Hannecard boasts 120 years of experience and has become one of Europe's leading suppliers of rubber, polyurethane, composite and carbide coverings for rolls used in various industries, from paper to steel, plastic, wood, board, textile and food & beverage production. We also develop elastomer specialties (surface protection, moulded parts & extruded profiles) for a range of industrial applications.

SOLID EXPERT KNOW-HOW

Our highly skilled and experi team relies on extensive expertise and know-how, and is driven to get the most out of all our customers' requests, not only in Europe, but worldwide. Through excellent resources, modern equipment and an open-minded approach, our teams at our three laboratories develop new rubber, polyurethane, composite and carbide compounds to meet the fast-changing needs of our customers. A specialised team looks into the broader functioning of rolls, resulting in total-concept solutions that create value. We can produce any type of roll cover for all industries.

A RELIABLE PARTNER FROM A TO Z

Hannecard has multiple production units across Europe, as well as various joint ventures and licensees worldwide. All of our sites meet the same strict quality standards, ensuring a reliable partner is never far away.





HANNECARD GROUP

FACTS & FIGURES

years of experience

+20

production sites

employees

+900



- La Elèche ERANCE
- (PAPER DIVISION) Dettwiller - FRANCE
- Bourgoin-Jallieu FRANCE
- Rüti SWITZERLAND Krakow - POLAND
- Cherepovets RUSSIA
- Kursk RUSSIA
- Ohio USA California - USA
- Pietermaritzburg SOUTH AFRICA
- (PAPER DIVISION

FOCUS ON:

A customer-oriented approach

High-quality R&D thanks to our in-house lab

> Innovative solutions and services

100.000 roll coverings a year



HANNECARD Joint Ventures GOMPLAST - SPAIN

- GOMPLAST CHINA
- MHP GERMANY
- HMSU Rollers INDIA
- TECNORULU ITALY
- HANNECARD TUNISIA HANNECARD - ALGERIA
- HAMICO BRASII

PRODUCTION SITES FOR THE PAPER INDUSTRY

- Hannecard France: production of up to 32 tonnes/12 metres (length) by 2.4 metres (diameter)
- Hannecard Russia: production of up to 25 tonnes/12 meter (length) by 1.6 metres (diameter)

A COMPLETE, CUSTOM SERVICE, FROM A TO Z

As a division of the Hannecard Group, we offer a complete service, from pulp production to converting, from new rolls and roll repairs to roll coverings and technical support. All backed by a strong global network and highly experienced teams.

You can count on us for the sale and engineering of new rolls and repairs, but also for the development of custom cost-reduction oriented solutions. A few examples? Nip profile optimisation, low-energy absorption covers and efficient dewatering solutions, such as the Surface Manager software, which allows you to optimize the cover surface design in order to lower the nip draining time. We can also perform a roll audit, both during operation and machine shutdown, provide any type of roll body and covers, and even assist you with your start-up. In a nutshell, Hannecard Paper is your trusted partner, from A to Z, for TCO (Total Cost of Ownership) solutions.

A CUSTOMER-ORIENTED APPROACH, INNOVATION AND QUALITY

Hannecard Paper can count on a highly specialised team of technical experts and collaborations with leading paper institutes. That allows us to offer a wide range of custom solutions and services, including the development of specific covers.

Innovation and quality lie at the heart of our activities. We constantly monitor technological developments to **improve the efficiency** of paper machines and to push the limits of our covers. Our in-house R&D laboratory is equipped to take charge of quality control during the production process. We also have the equipment and expertise required for the measurement of the dynamical, mechanical, thermal, tribological, chemical and surface properties of our covers. We can optimise cover bonding resistance in the nip vs. nip load, speed, temperature and chemicals, in both wet and dry environments. Last but not least, we comply with strict industry standards and regulations. We have ISO 9001 Quality certification, our compound measurement tolerances are in line with ISO 6123 standards and we respect the 'REACH' standards, i.e. the European Union Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals.



HANNECARD PAPER

NEW ROLLS AND ROLL REPAIRS

ROLL COVERINGS

TECHNICAL SUPPORT

HANNECARD PAPER

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HANNECARD

OUR SERVICES

We offer a wide range of services for the paper industry, from the repair of used rolls to the replacement or delivery of new rolls, and the development of roll covers and coatings for all types of paper production.

Our priorities? Listening to our clients to find the solutions that best meet their needs and optimise: maintenance costs, machine efficiency and paper quality.

ROLL COVERING

- New covering or recovering, in any position of the paper mill, from pulp preparation to converting:
- at our workshop: polyurethanes, composites, rubbers and carbides
- on site: carbides
- Grinding (drilling and/or grooving)
- at our workshop: all types of covers
- on site: cylindrical grinding on metallic or carbide-covered rolls
- Inspection & expertise
- Repair & cleaning
- Optimisation

2 MECHANICAL ROLL SERVICES

- Complete overhaul (including cleaning, washing and spare parts replacement according to the needs identified during disassembly & inspection) of:
- suction press rolls, suction couch rolls
- crown-controlled rolls such as Kusters, CCRolls and Nipco, including a test run with a hydraulic bench
- Spreader rolls overhaul, all brands (Mount Hope, Wittler, Plastex, Robec, Irga, Finbow, Tuvasa, Gorostidi, Kickert, Technomec, Hansen, Tevo, ...)
- Journal replacement
- Bearing seat repairs
- Non-destructive tests (crack tests): upon request, we can conduct ultrasonic, magnetic particle and colour tests in order to check for cracks on rolls and journals, so as to limit the risk of major mechanical failures
- \cdot Dynamical balancing at machine speed
- Cleaning and Painting

3 roll bodies

- New rolls (cores, shells and spreader rolls)
- Inspection & expertise
- Repair & cleaning
- Optimisation

4 VARIOUS

- Paper machine audit
- Rolls & doctoring inspections during machine shutdown
- Profile measurements
- Thermographic analysis
- Creation of roll drawings from 3D geometrical controls
- Chemical resistance
 optimisation
- Start-up assistance
- NIP optimisation: to verify the performance of the grinding profile, we can make nip impressions (static and dynamic) in machines and conduct a wear-profile analysis
- New transport boxes



HANNECARD PAPER PRODUCTS



absorption in the nip.

Hannecard has over a century of experience in a range of demanding industries & applications. We always strive to boost the eco-efficiency of our

guarantee the lowest heat build-up and energy

cover solutions and we are proud to say our products

THE INDESTRUCTIBLE DAMPER

- Optimal resistance to hydrolysis, temperature and abrasion
- The ideal solution for the most demanding press-roll applications
- Fine-tuned surface design with possible combination of suction drilling, blind drilling and grooving
- Multilayer bonding system, with proven safety recorded in more than 200 applications
- Lowest energy and highest vibration absorption



HARD & SOFT

RUBBER COVERS

ALL-TERRAIN **SPECIALIST**

- We develop and mix our own formulations
- Internal rubber mixing unit set up and sized in order to ensure:
- the best homogeneity for all our covers
- a constant repeatability of our production - a controlled rubber
- quality dispatch to all our production sites worldwide
- Statistical analysis of all batches produced Predictive simulation
- software to ensure an optimal vulcanisation of the most complex rolls

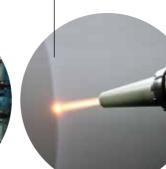
COMPOSITE 3 COVERS

THE

AVANT-



TUNGSTEN & CHROMIUM 4 CARBIDE COVERS

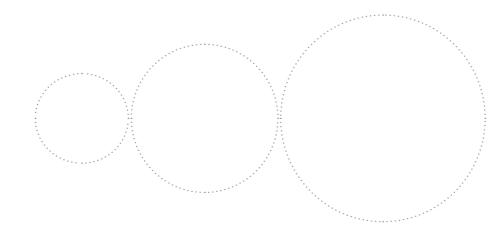


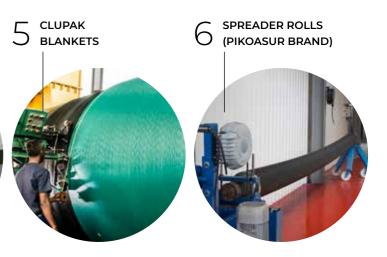
GARDIST

- Optimal surface release behaviour
- Highest shock absorption and energy dissipation
- Best abrasion and barring resistance
- Outmost profile stability and surface doctorability
- Excellent geometrical stability in high-temperature environments

THE SURFACE MASTER

- · Outstanding level of quality and reliability based on technology from the aeronautic industry
- Best resistance against corrosion in aqueous & acid environments
- Optimum resistance against oxidation at high temperatures
- Resistance against abrasion, erosion, cavitation and fretting
- Depending on the requested coating characteristics, we provide different thermal spray coating technologies, including HVAF M3, HVOF and electric arc for the production of tungsten and chromium carbides, nickel chromium and different metal coatings
- The latest technology available on the market: HVAF M3 gun for carbide covers providing the highest performance & homogeneity, the lowest porosity level (<0.5 %) and the best adhesive strength on the metal core (> 70 MPa)
- Coatings can be applied on site or at our workshop





The '8000 series' rubber blankets, used in Clupak machine sections, allow for paper extensibility through elongation in the nip.

- Characteristics:
- Superior crack resistance
- Excellent flexing & elongation characteristics
- Extended lifetime
- Optimal on-site grindability

- · Production of new spreader rolls since 2000
- Overhaul of existing spreader rolls (> 100 pcs / year)
- Offering solutions with rubber sleeves or metallic surface (steel, hard chromium, CarburFlon, PikoSpread)
- Optimization of unefficient design
- Experience on wide (> 9 m) and fast (> 2000 m/min) paper machines (StoraEnso, UPM, SmurfitKappa, Burgo, DS Smith, ArjoWiggins, Ahlstrom-Munksjö, Lecta, ...)

covers top-notch quality guaranteed

FORMING SECTION



| BREAST ROLL | , FORMING ROLL | | | | |
|-----------------|-----------------------|------------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Eco efficiency |
| Neostone | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ |
| Titan | Composite | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| Centaur | Composite | | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \circ$ |
| HanneSpray-Cr F | Plus Chromium Carbide | •••• | •••• | $\bullet \bullet \bullet \circ$ | •••• |
| WIRE ROLL T | | | | | |

| VVIRE ROLL, IAD | | | | | |
|--------------------|------------------|------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|
| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Eco efficiency |
| Neostone | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ |
| Titan | Composite | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| Centaur | Composite | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | •••• | $\bullet \bullet \bullet \circ$ |
| HanneSpray-Cr Plus | Chromium Carbide | • • • • | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \bigcirc$ | •••• |
| Carburflon NG | Tungsten carbide | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \bullet$ |

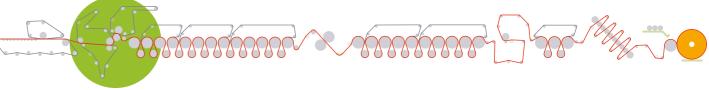
SUCTION COUCH CYLINDER, MILLSPAUGH

| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Eco efficiency |
|--------------|---|---------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| HanneDrive | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \circ \circ$ |
| FlexoDrive | Polyurethane | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| HanneSpray-W | Tungsten carbide | •••• | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \circ \circ$ | •••• |
| LUMPBREAKER | 2 | | | | |
| | and the second se | | | | |

| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Eco efficiency |
|--------------|----------|---------------------------------|------------------------------------|---------------------------------|---------------------------------|
| HanneLump | Rubber | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| HanneLump HT | Rubber | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | •••• | $\bullet \bullet \bullet \circ$ |

HELPER, WIRE DRIVING ROLL

| Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Eco efficiency |
|--------------|---------------------------------|---|--|--|
| Rubber | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \circ \circ$ |
| Polyurethane | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| | Compound Rubber | CompoundAbrasion resistanceRubber•••00 | CompoundAbrasion resistanceAnti-adhesive surfaceRubber● ● 0 0● ● 0 0 | CompoundAbrasion resistanceAnti-adhesive surfaceDoctorabilityRubber•••00•••00•••00 |



| HARD PRESS R | OLL, CENTER PRESS R | OLL, HARD SMOOT | HING PRESS | | |
|-----------------------------------|--|---------------------------------|---------------------------------|------------------------------------|------------------------------------|
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency |
| HanneRock Sirius Vega | Rubber Composite Composite | | | | |
| SOFT PRESS RO | DLL | | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency |
| HannePress Plus | Rubber | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \bigcirc$ |
| SOFT SMOOTH | ING PRESS | | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency |
| HannePress Visiomat II | Rubber Composite | | | •••• | |
| PAPER-TOUCH | ED ROLL, PAPER GUID | E ROLL | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency |
| Titan Centaur Carburflon NG | Composite Composite Tungsten carbide | | | | |

| HARD PRESS ROLL, CENTER PRESS ROLL, HARD SMOOTHING PRESS | | | | | | | | | | |
|--|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|--|--|--|--|--|
| | | | | | | | | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency | | | | | |
| HanneRock Sirius Vega | Rubber Composite Composite | | | | | | | | | |
| SOFT PRESS RO | LL | | | | | | | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency | | | | | |
| HannePress Plus | Rubber | $\bullet \bullet \bullet \circ$ | | | | | |
| SOFT SMOOTHIN | NG PRESS | | | | | | | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency | | | | | |
| HannePress Visiomat II | Rubber Composite | $\bullet \bullet \bullet \circ$ | | •••• | | | | | | |
| PAPER-TOUCHE | D ROLL, PAPER GUIDE ROLL | _ | | | | | | | | |
| Quality | Compound | Abrasion resistance | Doctorability | Sheet release | Eco efficiency | | | | | |
| Titan Centaur Carburflon NG | Composite Composite Tungsten carbide | | | | | | | | | |



SUCTION DESS DOLL DICK LID DESS DOLL

| SUCTION PRE | ESS ROLL, PICK UP F | PRESS ROLL | | | | |
|-----------------------------------|--|---------------------------------|-----------------------|--------------------------|-------------------------|-------------------|
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Vibration absorption | Eco efficiency |
| Alveomat Flexolys NeoFlex | Rubber Polyurethane Polyurethane | | | | | |
| PRESS ROLL | (PLAIN, BLIND DRIL | LED AND/OR C | ROOVED) | | | |
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Vibration absorption | Eco efficiency |
| HannePress Flexolys NeoFlex | Rubber Polyurethane Polyurethane | $\bullet \bullet \bullet \circ$ | | | | |

PRESS SECTION - 1 - in contact with paper



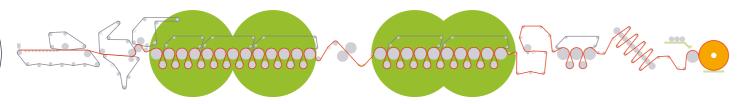
Roll covers overview

| JUMBO PRESS | ROLL (HLP, ENP) | | | | | |
|----------------|------------------|---------------------------------|------------------------------------|---------------------------------|---------------------------------|--|
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Eco efficiency | |
| HannePress HP | Rubber | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | |
| FELT ROLL, FEL | T GUIDE ROLL | | | | | |
| Quality | Compound | Abrasion resistance | Ageing resistance | Eco efficiency | | |
| Neostone | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | | |
| Titan | Composite | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \circ$ | | |
| Centaur | Composite | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | | |
| Carburflon NG | Tungsten carbide | •••• | •••• | •••• | | |

SPREADING FELT ROLL

| Quality | Compound | Abrasion resistance | Spreading effect | Eco efficiency |
|---------|----------|------------------------|---------------------|-------------------|
| | (UDDCI | •••• | | |

DRYING SECTION



| DRYER CYLINE | DER, CAN DRYER | | | | | |
|---------------|-------------------|------------------------|--------------------------|---------------|-------------------|--|
| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Eco efficiency | |
| CarburFlon NG | Tungsten carbide | •••• | •••• | •••• | •••• | |
| DRYING FELT | ROLL, DRYING WIRE | ROLL | | | | |
| O una litera | Companyational | Alexanina | | E e e | | |

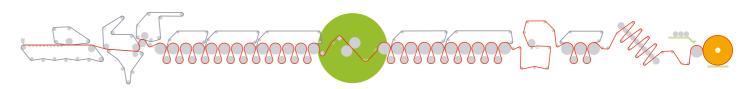
| Quality | compound | resistance | surface | efficiency | |
|---------------|------------------|-----------------------------------|------------------------------------|------------------------------------|--|
| Titan | Composite | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bigcirc$ | |
| Centaur | Composite | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \bigcirc$ | |
| Carburflon NG | Tungsten carbide | $\bullet \bullet \bullet \bullet$ | •••• | $\bullet \bullet \bullet \bullet$ | |

PAPER-TOUCHED ROLL, PAPER GUIDE ROLL

| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Friction coefficient | Antistatic properties | Eco efficiency |
|---------------|------------------|------------------------------------|---------------------------------|------------------------------------|-----------------------------------|---------------------------------|
| Titan | Composite | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bullet$ | $\bullet \circ \circ \circ$ | $\bullet \bullet \bullet \circ$ |
| Titan AS II | Composite | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \circ$ |
| Centaur | Composite | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \circ \circ \circ$ | $\bullet \bullet \bullet \circ$ |
| Carburflon NG | Tungsten carbide | •••• | •••• | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | •••• |

VACROLL, DRYING FELT / WIRE SUCTION CYLINDER

| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Corrosion resistance | Eco efficiency |
|--------------|------------------|------------------------|--------------------------|-----------------------------------|-------------------|
| HanneSpray-W | Tungsten carbide | •••• | •••• | $\bullet \bullet \bullet \bullet$ | •••• |



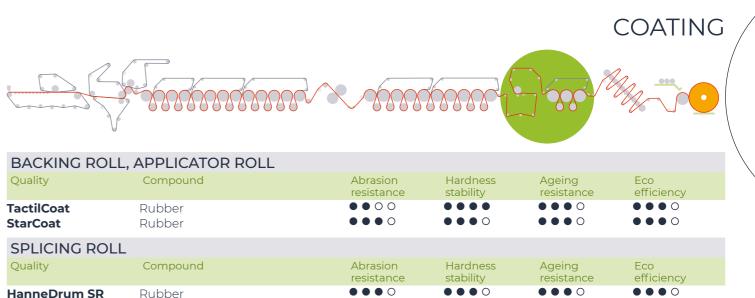
| HARD SIZE PRES | SS | |
|---|----------------------------|-------------------------------|
| Quality | Compound | Abrasion resistance |
| HelioRock Sirius SP | Rubber Composite | $\bullet \bullet \circ \circ$ |
| SOFT SIZE PRES | S | |
| Quality | Compound | Abrasion resistance |
| TactilSize TactilSize Plus XperSize | Rubber Rubber Rubber | |

FILM PRESS, SIZER PRESS ROLL

| Quality | Compound | resistance |
|-----------------|--------------|---------------------------------|
| TactilSize Plus | Rubber | $\bullet \bullet \circ \circ$ |
| Xpersize | Rubber | $\bullet \bullet \bullet \circ$ |
| ExoSize | Polyurethane | • • • • |

PAPER-TOUCHED ROLL, PAPER GUIDE ROLL

| Compound | Abrasion resistance |
|------------------|---------------------------------|
| Composite | $\bullet \bullet \circ \circ$ |
| Composite | $\bullet \bullet \bullet \circ$ |
| Tungsten carbide | •••• |
| | Composite |



| BACKING ROLL, | APPLICATOR ROLL | |
|---------------|-----------------|------------------|
| Quality | Compound | Abras resista |
| TactilCoat | Rubber | ••0 |
| StarCoat | Rubber | ••• |
| SPLICING ROLL | | |
| Quality | Compound | Abras resista |
| HanneDrum SR | Rubber | ••• |

Roll covers overview

SIZING

| Hardness stability vs T° | Eco efficiency |
|---------------------------------|------------------------------------|
| $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ |
| •••• | •••• |

| Hardness stability vs T° | Eco efficiency |
|---------------------------------|---------------------------------|
| $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \circ$ |
| $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| $\bullet \bullet \bullet \circ$ | •••• |

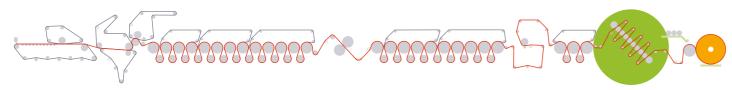
| Ageing resistance | Vibration absorpion | Film transfer | Eco efficiency |
|---------------------------------|------------------------------------|------------------------------------|-----------------------------------|
| $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ |
| $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \bullet$ |
| •••• | •••• | •••• | •••• |
| | | | |

| Anti-adhesive surface | Friction coefficient | Eco efficiency |
|------------------------------------|-----------------------------------|-----------------------------------|
| $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \circ \circ$ |
| $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| •••• | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bullet$ |

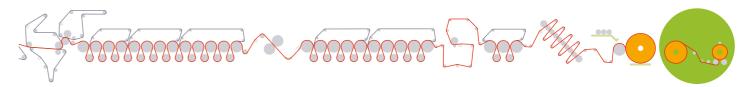


Roll covers overview

CALENDERING



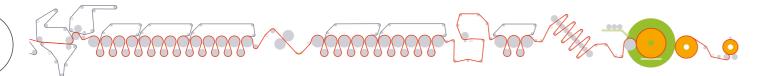
| SOFT CALENDER | ROLL | | | | | | |
|-------------------|------------------|-----------------------------------|---------------------------------|---------------------------------|------------------------------------|-----------------------------------|-----------------------------------|
| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Impact resistance | Temperature resistance | Eco efficiency |
| Visiomat II | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ |
| Diamantal | Composite | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bullet$ |
| Diamantal NG | Composite | $\bullet \bullet \bullet \bullet$ | •••• | •••• | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bullet$ |
| Diamantal HT | Composite | $\bullet \bullet \bullet \circ$ | •••• | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | •••• | •••• |
| HARD CALENDE | RROLL | | | | | | |
| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Doctorability | Impact resistance | Temperature resistance | Eco efficiency |
| HanneSpray-W | Tungsten carbide | $\bullet \bullet \bullet \circ$ | •••• | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \bullet$ | •••• |
| HanneSpray-W Plus | Tungsten carbide | •••• | •••• | •••• | •••• | •••• | •••• |
| MARKING PRESS | S (CIGARETTE P | APER) | | | | | |
| Quality | Compound | Abrasion resistance | Anti-adhesive surface | Impact resistance | Temperature resistance | Eco efficiency | |
| | | resistance | Sunace | resistance | resistance | chickency | |



0000

| DRUM ROLL | | | |
|--|--|------------------------|----------------------|
| Quality | Compound | Abrasion resistance | Impact resistance |
| HannePrene AS Flexolys Foam HanneSpray-W | Rubber Polyurethane Tungsten carbide | | |
| RIDER ROLL | | | |
| Quality | Compound | Abrasion resistance | Impact resistance |
| HanneRide Flexolys Foam HanneSpray-W | Rubber Polyurethane Tungsten carbide | | |

REELING



| REEL SPOOL | | | | | | |
|---|------------------------------|---------------------------------|-------------------------------|---------------------------------|------------------------------------|---------------------------------|
| Quality | Compound | Abrasion resistance | Impact resistance | Temperature resistance | Antistatic properties | Eco efficiency |
| Protecthane Plus Protecthane Plus AS | Polyurethane Polyurethane | | •••• | | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \circ$ |
| REEL DRUM, POP | PE REEL | | | | | |
| Quality | Compound | Abrasion resistance | Impact resistance | Temperature resistance | Eco efficiency | |
| HanneDrum SR HanneSpray-W | Rubber Tungsten carbide | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | |

| SUCTION PRESSURE ROLL | | | | | | | |
|--|--|------------------------|-----------------------|--------------------------|-------------------------|-------------------|--|
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Vibration absorption | Eco efficiency | |
| TissuPress TissuStar NeoFlex T | Rubber Rubber Polyurethane | | | | | | |
| PRESSURE ROLL (PLAIN, BLIND DRILLED AND/OR GROOVED) | | | | | | | |
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Vibration absorption | Eco efficiency | |
| TissuPress TissuStar StarPress II NeoFlex T | Rubber Rubber Rubber Polyurethane | | | | | | |
| YANKEE CYLINDER WITH CYLINDRICAL PROFILE | | | | | | | |
| Quality | Compound | Abrasion | Doctorability | Heat | Creping | Eco | |

| JUCHONFRE | JOOKL KOLL | | | | | | |
|---|--------------|------------------------------------|------------------------------------|---------------------------------|---------------------------------|------------------------------------|--|
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Vibration absorption | Eco efficiency | |
| TissuPress | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \circ \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | |
| TissuStar | Rubber | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | |
| NeoFlex T | Polyurethane | •••• | •••• | •••• | •••• | •••• | |
| PRESSURE ROLL (PLAIN, BLIND DRILLED AND/OR GROOVED) | | | | | | | |
| Quality | Compound | Abrasion resistance | Hardness stability | Dewatering efficiency | Vibration absorption | Eco efficiency | |
| TissuPress | Rubber | $\bullet \bullet \circ \circ$ | $\bullet \circ \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ | |
| TissuStar | Rubber | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | |
| StarPress II | Rubber | $\bullet \bullet \bullet \bullet$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \bigcirc$ | |
| NeoFlex T | Polyurethane | •••• | •••• | •••• | •••• | •••• | |
| YANKEE CYLINDER WITH CYLINDRICAL PROFILE | | | | | | | |
| Quality | Compound | Abrasion | Doctorability | Heat | Creping | Eco | |

| YANKEE CYLINDER WITH CYLINDRICAL PROFILE | | | | | | | |
|--|--------------------------------------|---------------------------------|---------------|------------------|------------------------------------|------------------------------------|--|
| Quality | Compound | Abrasion resistance | Doctorability | Heat Transfer | Creping process | Eco efficiency | |
| HanneSpray-Cr HanneSpray-Cr Plus | Chromium Carbide Chromium Carbide | $\bullet \bullet \bullet \circ$ | | | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \bullet \bigcirc$ | |

Roll covers overview

WINDING

| Dampening efficiency | Friction coefficient | Friction coeff. stability | Eco efficiency |
|-------------------------------|------------------------------------|---------------------------------|---------------------------------|
| $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ |
| •••• | •••• | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |
| 0000 | $\bullet \bullet \bullet \circ$ | •••• | •••• |
| | | | |
| Dampening efficiency | Friction coefficient | Friction coeff. stability | Eco efficiency |
| $\bullet \bullet \circ \circ$ | $\bullet \bullet \bullet \bigcirc$ | $\bullet \bullet \circ \circ$ | $\bullet \bullet \circ \circ$ |
| •••• | •••• | $\bullet \bullet \bullet \circ$ | $\bullet \bullet \bullet \circ$ |

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