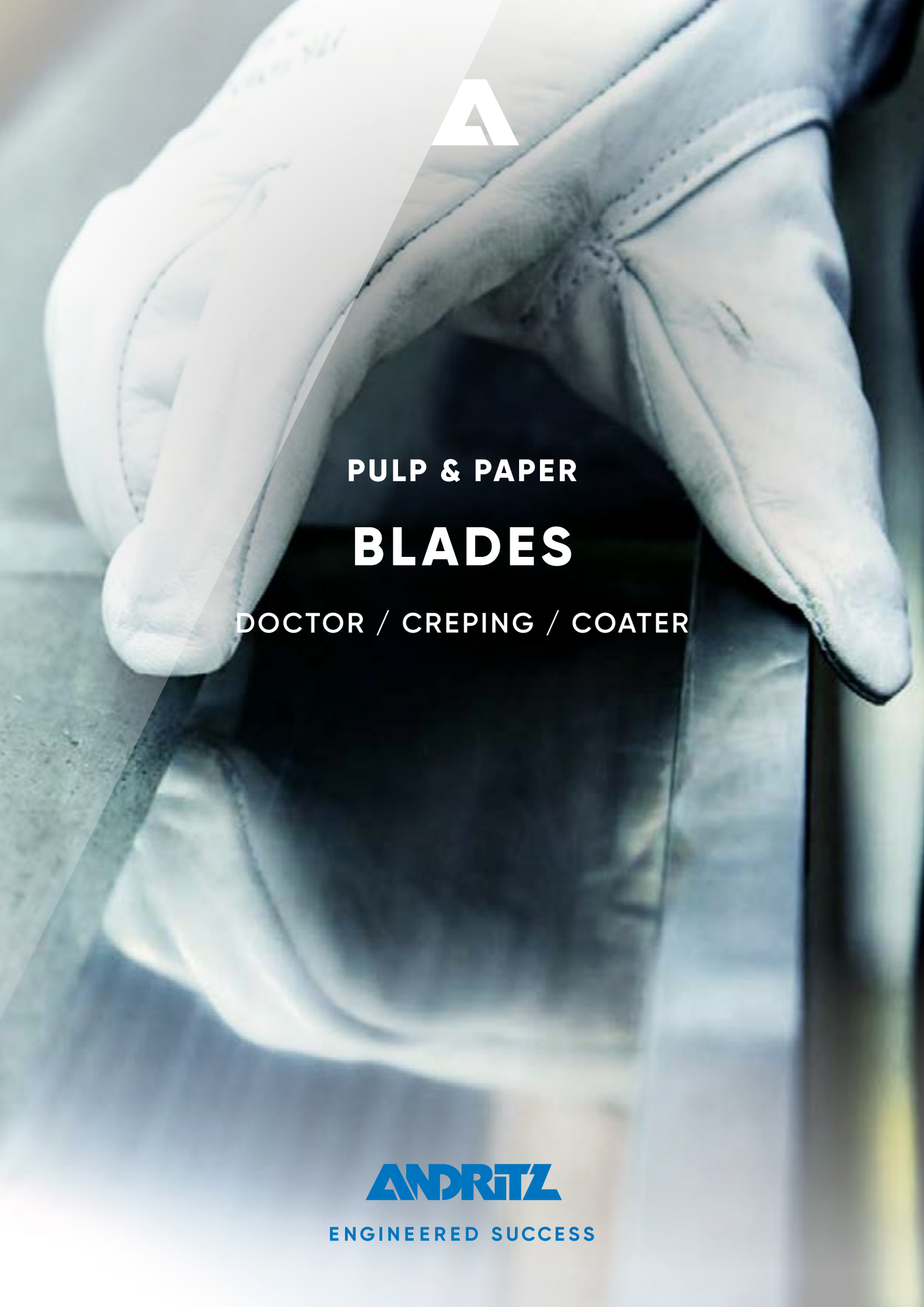


PULP & PAPER

BLADES

DOCTOR / CREPING / COATER

ANDRITZ

ENGINEERED SUCCESS

CONTENTS

Doctor Blades

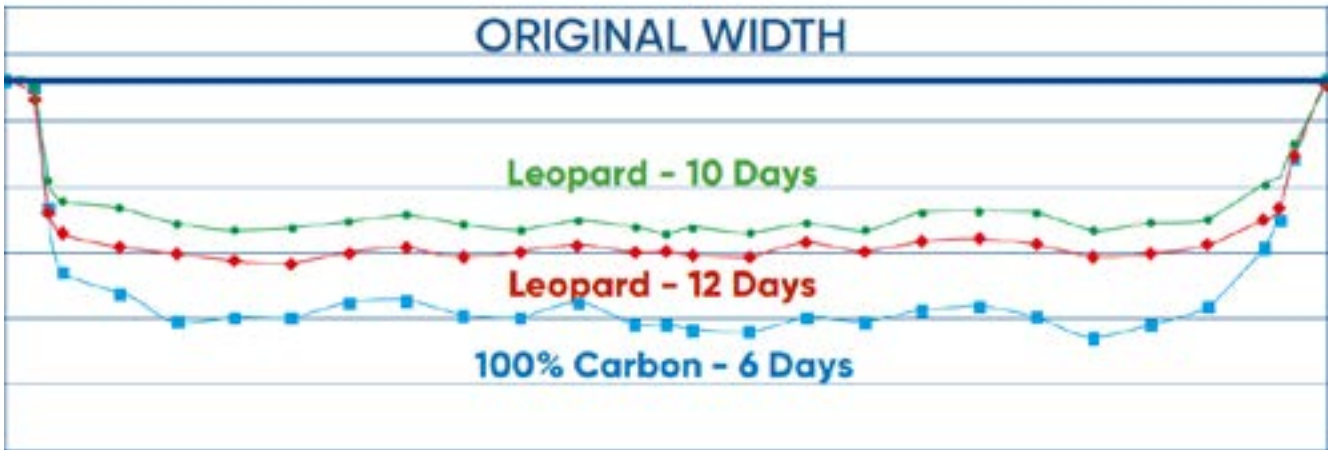
Our manufacturing plants in Western Europe and North America supply a wide range of doctor blades suitable for all applications on the paper machine.

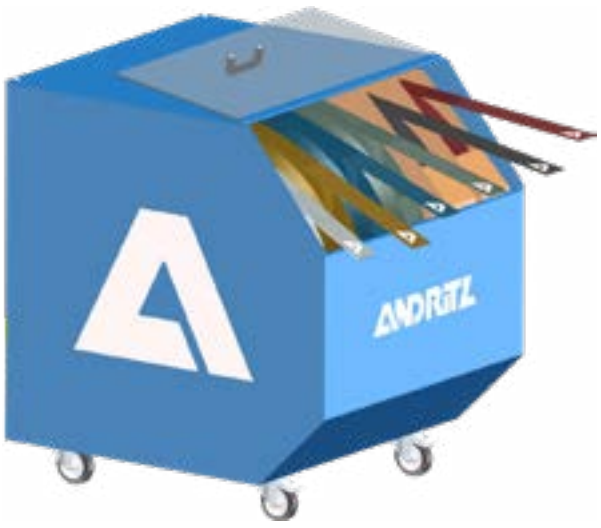
The combination of a strong presence within all paper manufacturing countries in the world and the centralization of all application experiences within the italian ANDRITZ R&D Center, allow for continuous state-of-the-art doctoring solutions. This practice has been one of the keys of our success.

The perpetual development and demands of paper making technologies is the motivation for constant research of new materials to better satisfy paper makers' requests. Inventories of various materials in our warehouses and manufacturing facilities throughout the world allow fast and efficient deliveries to clients.

CASE HISTORY: WEAR PATTERN ON CARBON FIBER DOCTOR BLADES

With the Leopard Doctor blade you can expect consistently longer blade lifetime, hence fewer blade changes and higher machine efficiency.
Leopard Doctor blade, suitable for demanding applications and a must for your ceramic rolls.





Choice of the blade

WIRE SECTION

Roll Location	Roll Description	Blade Angle	Blade Load	Recommended Blade Type < 600 M/min	600-1000 M/min	> 1000 M/min
WIRE ROLL	RUBBER 21-45 PJ	20°	90-110 N/m	A3	A3	A1
	RUBBER 4-20 PJ	25°	90-110 N/m	A3	A1-B5	A1-B5
	POLYURETHANE 10-20 PJ	20°	90-110 N/m	A3	A1-B5	A1-B5
	RUBBER 0- 3 PJ	25°	90-110 N/m	A3	B7-B1-BU	B7-B1-BU
	COMPOSITE 90ShD	25°	90-110 N/m	B1-BU	B1-B4-BU	B1-B4-C1-BU
	CERAMIC 1.000 HV	25°	90-110 N/m	B1-BU	B1-B4-BU	B1-B4-C1-BU
BREAST ROLL	RUBBER 21-45 PJ	20°	90-110 N/m	A3	A3	A1
	RUBBER 4-20 PJ	25°	90-110 N/m	A3	A1-B5	B5
	RUBBER 0- 3 PJ	25°	90-110 N/m	A3	A1-B5-B7-B3	A1-B5-B7-B3
	COMPOSITE 90 ShD	25°	90-110 N/m	B1-BU	B1-B4-BU	B1-B4-C1-BU
COUCH ROLL	RUBBER 21-45 PJ	20°	90-110 N/m	A3	A3	A3
	RUBBER 4-20 PJ	25°	90-110 N/m	A3	A1	A3
	RUBBER 0- 3 PJ	25°	180-200 N/m	A3	A1-B7-B3	A1-B7-B4
	COPPER	25°	180-200 N/m	B7	B3-B7-B1	B3-B7-B1
	STAINLESS STEEL	25°	180-200 N/m	B7	B3-B7-B1	B3-B7-B1

PRESS SECTION

FELT ROLL	RUBBER 4-20 PJ	20°	110-130 N/m	B5-B7	B5-B7	B5-B7
	RUBBER 0- 3 PJ	25°	110-130 N/m	A3-A1	A3-A1	B7-B3
	RUBBER > 20 PJ	20°	80-130 N/m	A3-A1	A3-A1	A3-A1
	POLYURETHANE 4-20 PJ	20°	80-130 N/m	A3-A1	A3-A1	A3-A1
	POLYURETHANE > 20 PJ	20°	80-130 N/m	A3-A1	A3-A1	A3-A1
	STAINLESS STEEL	25°	150-180 N/m	B7-B3-B1	B7-B3-B1	B7-B3-B1
PRESS ROLL	RUBBER 0-1 PJ	25°	250-300 N/m	C1-B4	C1-B4	C1-B4
	COMPOSITE 90 ShD	25°	300-350 N/m	C1-B4	C1-B4	C1-B4
	CERAMIC 1.000 HV	27°	300-350 N/m	C1-LE-CT	C1-LE-CT	C1-LE-CT
VENTA NIP	RUBBER 0-3 PJ	25°	250-300 N/m	B7	B3-B7	B3-B7
	POLYURETHANE 4-20 PJ	20°	80-130 N/m	A3-A1	A3-A1	A3-A1
	COMPOSITE 90 ShD	25°	200-250 N/m	B1-C1	B1-C1	B1-C1
	STAINLESS STEEL	25°	250-300 N/m	B7	B3-B7-B1	B3-B7-B2

DRYER SECTION

DRYER CAN	CAST IRON	30°	180-250 N/m	BZ-B7-ST-BR	BZ-B7-ST-BR-B1	BZ-B3-ST-BR-B1
	CHILLED IRON	30°	180-250 N/m	BZ-B7-ST-BR	BZ-B7-ST-BR-B1	BZ-B3-ST-BR-B1
	CHROME PLATED	30°	180-250 N/m	B7	B3-B1	B3-B1-C1
	CHROME TEFLON	15°	90-110 N/m	B5	B5	B5
	RUBBER 0-1 PJ	25°	90/110 N/m	B7	B7-B1-BU	B7-B1-CU
	COMPOSITE 88-92 ShD	25°	90/110 N/m	B1-BU	B1-B4-BU	B1-B4-C1-BU
	CERAMIC 1.000 HV	25°	250-300 N/m	C1-LE-CT	C1-LE-CT	C1-LE-CT
POPE REEL	CAST IRON	30°	180-250 N/m	BZ-B7-ST-BR-B1	BZ-B7-ST-BR -B1-C1	BZ-B3-ST-BR-B1-C1
CALENDER ROLL	CHILLED IRON	25°	150-200 N/m	B3-B1-C1-HR	B3-B1-C1-HR	B3-B1-C1-HR
	CAST IRON	25°	150-200 N/m	B3-B1-C1-HR	B3-B1-C1-HR	B3-B1-C1-HR
	TUNGSTEN CARBIDE COATED	25°	150-200 N/m	B3-B1-C1-HR	B3-B1-C1-HR	B3-B1-C1-HR
	COMPOSITE 88-92 ShD	16°	30-50 N/m	ST	ST	ST
	RUBBER 85-90 Shore D	16°	30-50 N/m	ST	ST	ST

Metallic Blades

BZ - BT - 18 - 13 - CT - ST

BZ - BRONZE

Hard rolled bronze

- Hardness ≥ 205 HV
- Standard thicknesses: 0,89 - 1,2 mm (.035" - .050")

BT - BRONZE SUPERNOVA

Hard rolled bronze with tungsten carbide coating

- Coating Hardness HV 1050-1150
- Standard thickness: 1,2 mm (.050")

18 - STAINLESS STEEL 18/8

Hard rolled AISI 301 austenitic stainless steel

- Hardness HRC 44-48
- Standard thickness: 1,2 mm (.050")

13 - STAINLESS STEEL 13% Cr

Hardened and tempered AISI 420 martensitic stainless steel (13% Cr)

- Hardness HRC 42-46
- Standard thickness: 1,2 mm (.050")

CT - STAINLESS STEEL 13% Cr SUPERNOVA

Hardened and tempered AISI 420 martensitic stainless steel (13% Cr) with tungsten carbide coating

- Coating Hardness: HV 1050-1150
- Standard thickness: 1,2 mm (.050")

ST - HARDENED STEEL

Hardened and tempered steel with 0,75% Carbon content

- Hardness: HV 475-515
- Standard thicknesses: 0,80 - 1,00 - 1,2 m (.032" - .039" - .050")

Fiberglass Blades

B3 - B7 - BR - HR

B3 - SUPEREPOXY

Fiberglass asymmetric layers arranged to obtain superior resistance to wear and pressed with epoxy resin

- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 1,80 - 2,80 mm (.055" - .071" - .110")

B7 - EPOXY

Fiberglass layers pressed with epoxy resin

- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 1,80 - 2,30 - 2,80 mm (.055"-.071"-.090"-.110")

BR - ABRASIVE

Fiberglass layers with addition of abrasive fillers to improve the cleaning action, pressed with epoxy resin

GRIT 150

- Temperature resistance up to 175°C
- Standard thicknesses: 1,50 - 2,00 mm (.059" - .079")

HR - HOT EPOXY

Fiberglass layers, pressed with high temperature resistance epoxy resin

- Temperature resistance up to 230°C
- Standard thickness: 1,40 mm (.055")

Poly and Composite Blades

A3- A1 - B5

A3 - POLYSET

Ultra High Molecular Weight virgin polyethylene

- Temperature resistance up to 80° C
- Standard thickness: 5/3 mm (.20"/.12")

A1 - SUPERPOLYSET

Ultra High Molecular Weight polyethylene reinforced with glass fibers

- Temperature resistance up to 80° C
- Standard thickness: 5/3 mm (.20"/.12")

B5 - PHENOSET

Cotton fiber layers pressed with phenolic resin

- Temperature resistance up to 120°C
- Standard thicknesses: 2,30 - 2,80 mm (.090" - .110")

Carbon Fiber Blades

C1 - LE - LR

C1 - SUPERCARBOSET

100% Carbon fiber layers pressed with epoxy resin

- Excellent chemical resistance
- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 2,00 mm (.055" - .079")

LE - LEOPARD

100% Carbon fiber layers pressed with enhanced epoxy resin to obtain excellent resistance to wear

- Excellent chemical resistance
- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 2,00 mm (.057" - .079")

LR - LEOPARD ABRASIVE

100% Carbon fiber layers pressed with enhanced epoxy resin and addition of abrasive fillers for an excellent cleaning action combined with an outstanding resistance to wear .

- GRIT 600
- Temperature resistance up to 175°C
- Standard thickness: 2,00 mm (.079")

Carbon Fiber and Fiberglass Blades

B1 - B4 - BK - BU - CR - DR

B1 - CARBOSET

Fiberglass and 2 carbon fiber layers pressed with epoxy resin

- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 2,00 mm (.055" - .079")

B4 - CARBOSET

Fiberglass and 4 carbon fiber layers pressed with epoxy resin

- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 2,00 mm (.055" - .079")

BK - CARBOKAPPA

Fiberglass and 1 carbon fiber layer, pressed with epoxy resin

- Temperature resistance up to 175°C
- Standard thicknesses: 1,50 - 2,00 mm (.059" - .079")

BU - CARBOSET

Fiberglass and 4 carbon fiber layers pressed with epoxy resin

- Layers are arranged to obtain high flexibility in length and excellent stiffness in width (machine direction)
- Temperature resistance up to 175°C
- Standard thicknesses: 1,45 - 2,00 mm (.057" - .079")

CR - CARBON ABRASIVE

Fiberglass and 2 carbon fiber layers with epoxy resin and abrasive fillers to improve the cleaning action

- GRIT 1200
- Temperature resistance up to 175°C
- Standard thickness: 1,50 mm (.059")

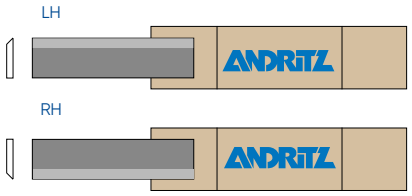
DR - CARBOABRASIVE

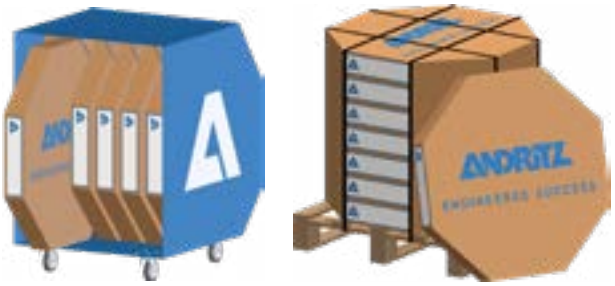
Fiberglass and 4 carbon fiber layers with epoxy resin and abrasive fillers

- GRIT 600
- Temperature resistance up to 175°C
- Standard thickness: 1,90 mm (.075")

Packaging

Our doctor blades are normally packed in coil form, inside corrugated boxes on wooden pallets.
To fit box carts, we can supply boxes with doctor blades coiled, connected at the ends.





Note:
Packaging and shipping method of the blades may vary, depending on country of manufacture

Creping Blades

Our ambition is to contribute to maintaining the tissue paper manufacturing process constant and efficient.

For optimum results in the tissue process the raw material of creping blades must comply with very tight technical requirements and it must also be uniform over time.
Variations in hardness for the same blade cannot be accepted.
To achieve these results the choice and selection of raw materials are key factors.
Our plants for the production of creping blades use the most advanced technologies and the most modern beveling equipment, thus guaranteeing that our clients will receive the highest quality together with prompt deliveries.

We use beveling and grinding techniques that are the result of decades of experience in high-precision mechanical operations, thus highlighting the importance of the added value found in our blades for the production of tissue paper.

TRADITION

Hardened and tempered Carbon Steel with Carbon content 0,75% (AISI 1074) Hardness: HRC 47 - 50

Hardened and tempered Carbon Steel with Carbon content 1% (AISI 1095) Hardness: HRC 51 - 54

Hardened and tempered martensitic Stainless Steel with 13% Chrome (AISI 420) Hardness: HRC 42 - 46

Evolution of Creping Blades

MIZAR
Traditional reliability combined with the high level of performance of ceramic materials.

BENEFITS
- Long blade life
- Maximum machine efficiency
- High resistance to thermal shocks
- Greater sheet softness
- Highest stability of the sheet's quality parameters

SIRIUS
A carbon steel blade with the operating edge coated in chrome carbide.

BENEFITS
- Better resistance to chipping compared with ceramic blades
- Maximum stability over time of paper quality parameters
- Lifetime comparable to ceramic blades
- Maximum machine efficiency

Technical data

Standard and corresponding tolerances

	MM	INCH
Mizar - Sirius	0,89 +/- 0,030	.035" +/- .0012"
	1,00 +/- 0,030	.039" +/- .0012"
	1,20 +/- 0,035	.050" +/- .0014"
	1,50 +/- 0,050	.060" +/- .0020"
stainless steel 13%Cr (AISI 420)	1,27 +/- 0,050	.050" +/- .0020"

Standard widths

	MM	INCH
Mizar - Sirius	101	4"
	114	4,5"
	120	4,75"
	127	5"
	130	5,12"
stainless steel 13%Cr (AISI 420)	114	4,5"
	127	5"

*** Other dimensions and combinations upon request

Geometries:
Bevel angle α: 45° < α ≤ 90°
Reverse bevel

Straightness:
Finished blades max. 0,2 mm on 1000 mm
Coils max. 0,6 mm on 1000 mm

HARDNESS
- Coated area MIZAR HV 0,3 1.150 +/ - 150

Packaging

Coils in octagonal carton boxes on pallet

Finish blades cut in length: long wooden cases

Coater Blades / Carbon Steel

Our manufacturing philosophy bases its succes on consistent high quality.

A careful selection of raw materials, manufacturing processes accomplished with state-of-the-art technical equipment, tested packaging systems and service capable of meeting all of customer's requirements.
Manufacturing plants in Western Europe and North America share the same constantly-evolving production technologies, ensuring our outstanding quality on the market. Product experiences and developments from each plant are controlled and centralized in the italian R&D Center, using its expertise and scientific know-how to provide customers with the most advanced product for any given application.

Profiling is easier from the beginning of the run.
Most coaters are not perfectly straight in the CD direction, whether it is a profile bar issue or wear issues with the backing roll.
That is not a problem for steel blades.

STANDARD THICKNESSES AND CORRESPONDING TOLERANCES

MM	INCH
0,305 mm +/-0,010	.012" +/- .00039"
0,381 mm +/-0,010	.015" +/- .00039"
0,457 mm +/-0,010	.018" +/- .00039"
0,508 mm +/-0,010	.020" +/- .00039"
0,635 mm +/- 0,020	.020" +/- .00078"

STANDARD WIDTHS AND CORRESPONDING TOLERANCES

MM	INCH
76,2 mm +/-0,15	3" +/- .0059"
84 mm +/-0,15	3.307" +/- .0059"
86 mm +/-0,15	3.385" +/- .0059"
88,9 mm +/-0,15	3.5" +/- .0059"
100 mm +/- 0,15	3.937" +/- .0059"

*** Other dimensions and combinations upon request

BENEFITS
- Excellent adaptability to machine conditions
- Low cost
- Outstanding reliability and consistency over time

HARDNESS
- Tensil Strength: N/mm2 1830÷ 1930 (*)
- Hardness: HV20 535÷560 (*)

(*) on thickness 0,381mm (.015")

PACKAGING
Corrugated boxes weighing from 30 to 50 lbs. (20 to 35 kg) protect the blades against damages and can easily be carried near the paper machine.

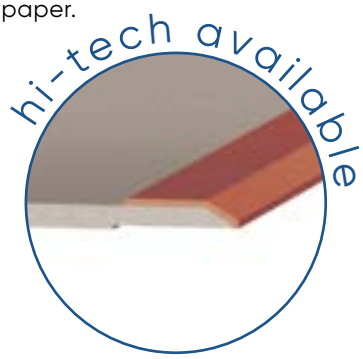
Hi-Tech

A rigid blade body with a flexible tip is but a dream for many paper makers who work with a stiff blade mode. A mechanical process of the highest accuracy makes it possible to attain results unexpected with a traditional-geometry blade.
The thickness reduction at the tip is normally 0,1 mm (.0039") for a height of 5 mm (.2").

BENEFITS
Working load is reduced for a given amount of coating or, as an alternative:
- Less coating for a given load
- Possible increase in solids for better paper quality and a drop in drying costs
- Better runnability tied to lower loads and a more flexible blade
- Faster profile setting than with thicker blades

Alcor

ALCOR is our newest version of steel coater blade having the tip coated with a layer of tungsten carbide powders blended according to a novel formulation.
While maintaining all the advantages of the Supernova blade, now fully established worldwide for its performance, ALCOR adds an economical plus guaranteeing an excellent quality / price ratio.
The superior mechanical features of tungsten carbide provide better gloss and a low surface r oughness of paper.



The coefficient of friction that is lower than that of a standard carbon steel blade translates in fewer streaks and a better runnability.
ALCOR is highly wear-resistant, keeps its original geometry over time, thus ensuring stable production quality.
The ability to machine this type of blades on both side of the Atlantic has proven a huge advantage for our customers as it minimizes the risk of long lead times and potential delays associated with overseas transportation.
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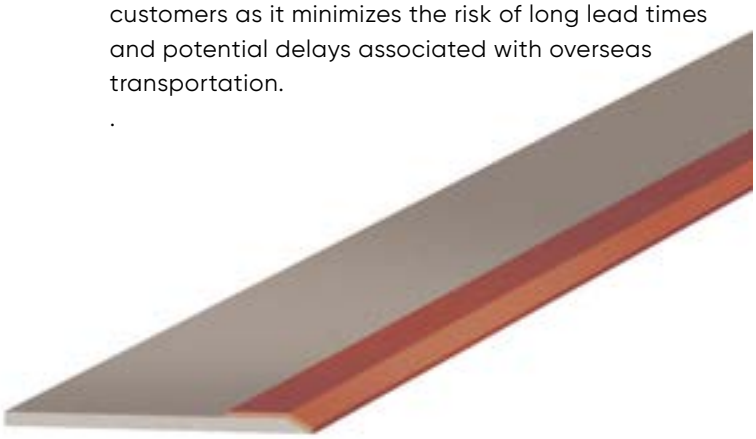


STANDARD THICKNESSES AND CORRESPONDING TOLERANCES

MM	INCH
0,381 mm +/-0,010	.015" +/- .00039"
0,457 mm +/-0,010	.018" +/- .00039"
0,508 mm +/-0,010	.020" +/- .00039"
0,635 mm +/- 0,020	.020" +/- .00078"

STANDARD WIDTHS AND CORRESPONDING TOLERANCES

MM	INCH
76,2 mm +/-0,15	3" +/- .0059"
84 mm +/-0,15	3.307" +/- .0059"
100 mm +/- 0,15	3.937" +/- .0059"

*** Other dimensions and combinations upon request

BENEFITS
- Best profile stability over time
- Longest blade life
- Best paper qualiy PPS
- Best paper gloss
- Maximum machine efficiency

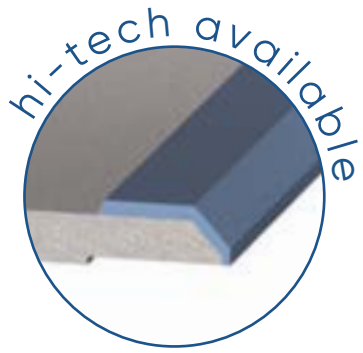
HARDNESS
Coated area
HV 0,3 1150 +/ - 50

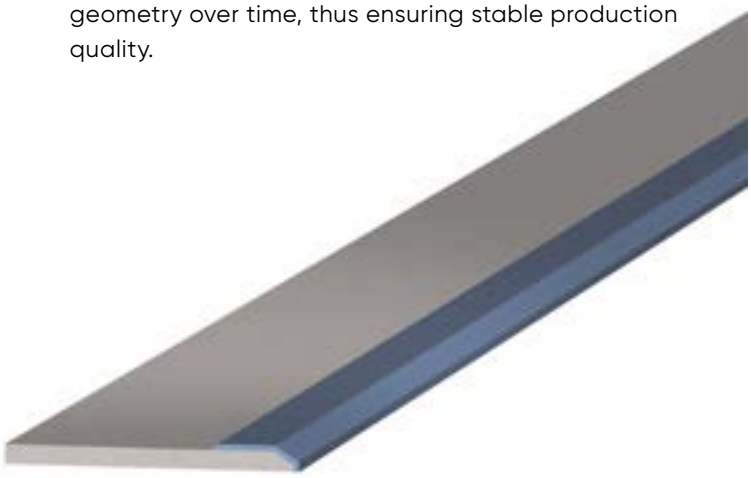
PACKAGING
Square carton boxes on pallet

Supernova

The constant technological evolution in the production of coated paper demands the use of increasingly sophisticated and high-performance coater blades. The primary aim of our R&D has been the continuous development and testing of advanced applications on materials, in order to enhance production efficiency and the overall runnability of coater machines. The result is called Supernova, a blade with the tip coated with tungsten carbide.
We designed state-of-the-art manufacturing equipments to produce the best available blade on the market.

Bevels are manufactured to customer's tight specifications, to attain a correct and consistent coat weight and outstanding paper quality right from the start and throughout the blade's lifetime.
The superior mechanical features of tungsten carbide provides better gloss and a low surface roughness of paper. The coefficient of friction that is lower than that of a standard carbon steel blade translates in fewer streaks and a better runnability.
Supernova is highly wear-resistant, keeps its original geometry over time, thus ensuring stable production quality.





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76,2 mm +/-0,15	3" +/- .0059"
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*** Other dimensions and combinations upon request

BENEFITS
- Best profile stability over time
- Longest blade life
- Best paper qualiy PPS
- Best paper gloss
- Maximum machine efficiency

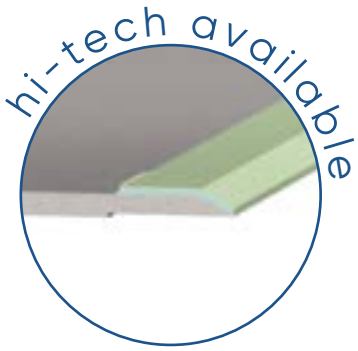
HARDNESS
• Coated area
HV 0,3 1100 +/ - 50

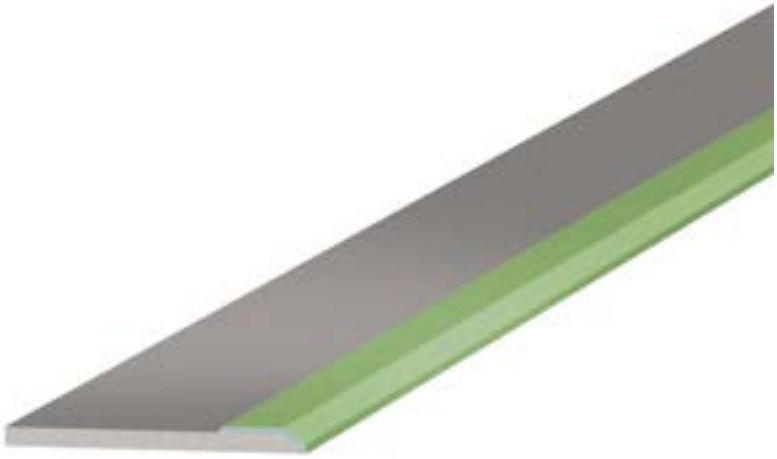
PACKAGING
Square carton boxes on pallet

Sirius

A softer alternative to the Alcor and Supernova, the Sirius blades boast comparable performance in terms of blade life and sheet surface gloss and roughness. The Sirius blades are sprayed in-house on our state-of-the-art metallization equipment and are machined to the same tight tolerances and on the same tailored designed CNC machines we use for both the Alcor and Supernova blades, CNC machines that are now installed both in Europe and in the US.

When it comes to performance, the softer layer of chrome carbide sprayed on the tip of the blade allows for a shorter break-in time and a faster start-up. Having this in mind the Sirius blade is optimized for top coating applications on coated board machines.





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84 mm +/-0,15	3.307" +/- .0059"
100 mm +/- 0,15	3.937" +/- .0059"

*** Other dimensions and combinations upon request

BENEFITS
- Best profile stability over time
- Longest blade life
- Best paper qualiy PPS
- Best paper gloss
- Maximum machine efficiency

HARDNESS
• Coated area
HV 0,3 900 +/ - 50

PACKAGING
Square carton boxes on pallet

TO DISCOVER THE BEST SOLUTIONS FOR YOUR NEEDS, PLEASE CONTACT YOUR RESPECTIVE GLOBAL LOCATION BELOW

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