



MATERIALS FOR DEMANDING APPLICATIONS

PrimeCeramic wear surfaces

ANDRITZ

PrimeCeramic wear surfaces

Materials for demanding applications

The type of ceramic and blade design plays a critical role in the overall operation and efficiency of the wet end of the paper machine. The ceramic properties which are important to their performance are; wear resistance, gentleness to fabrics, chip resistance, thermal shock resistance and thermal conductivity.

OUR MATERIALS

- PrimeCeramic AO – Aluminum Oxide**
 - Widely used in paper machine forming sections
 - Good cost to benefit ratio
- PrimeCeramic Magenta**
 - ANDRITZ proprietary ceramic formulation
 - Improved wear and toughness properties
- PrimeCeramic SN – Silicon Nitride**
 - Flexible use in multiple applications
 - Very smooth surface with good wear resistance and excellent flexural strength
- PrimeCeramic SC – Silicon Carbide**
 - Most widely used non-oxide industrial ceramic
 - Very good hardness and thermal conductivity

OUR CERAMICS

ANDRITZ is able to deliver custom designed ceramics as well as proprietary designed blades and engineered drainage systems. Our ceramics are the highest quality and suited for all paper machine designs and paper grades. Our goal is to provide ceramic blade designs as part of our integrated wet end solutions to improve overall efficiencies.



Manufacturing to the exacting specifications necessary for paper machine equipment

Best material choice

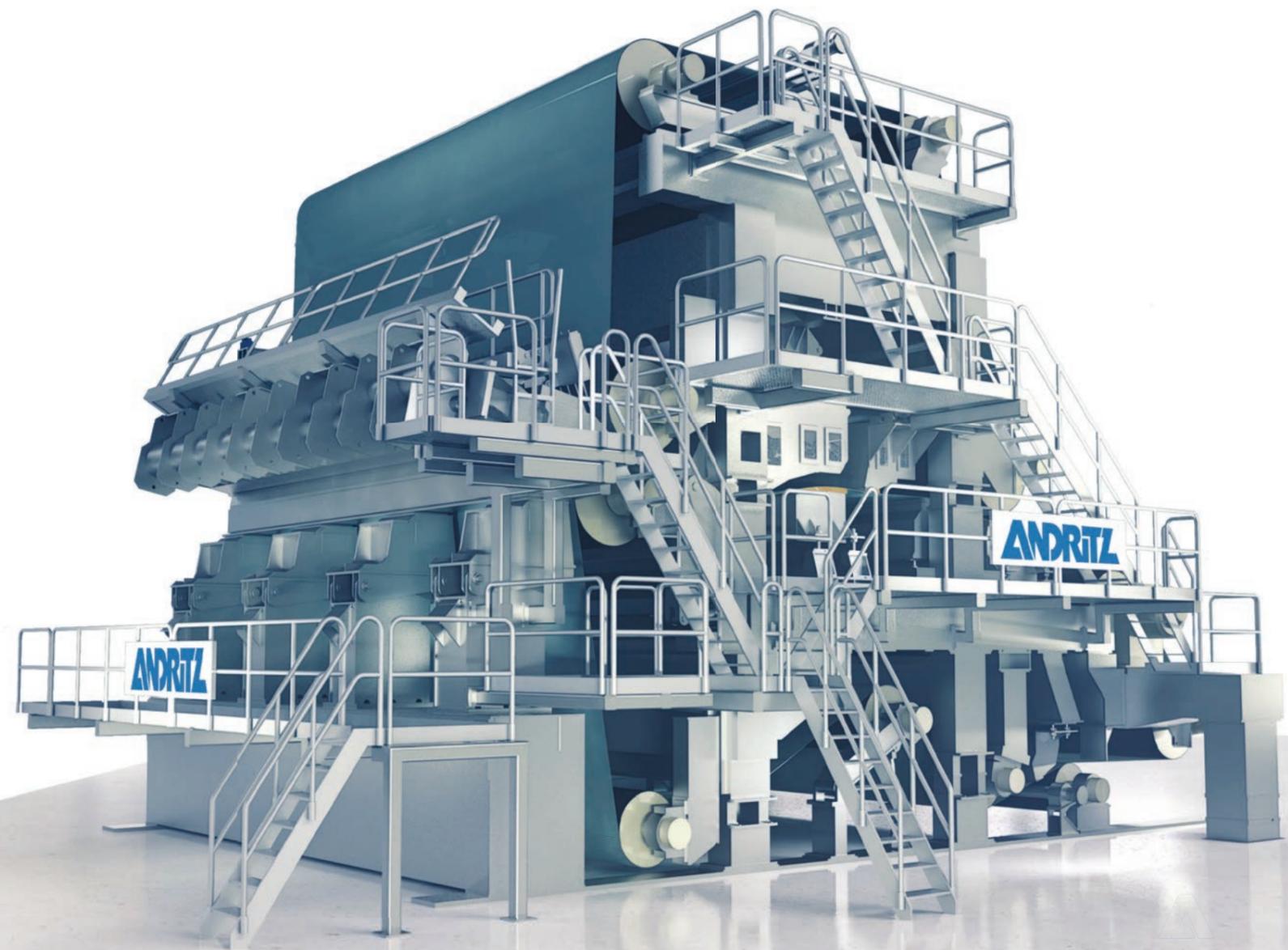
Mechanical properties and material selection

The quality of the ceramic material varies by manufacturer. ANDRITZ has been involved in the development and evaluation of a wide variety of ceramic materials for use in the manufacturing of ceramics supplied to the paper industry for over 50 years.

ANDRITZ is the only ceramic blade manufacturer that invests resources to test ceramic material properties specifically for use in the paper industry. We continually work with ceramic manufacturers to test potential new

ceramic materials and evaluate quality and reliability of ceramic material properties.

In addition to the standard material property tests – such as hardness, thermal shock, porosity/surface finish and thermal conductivity – several proprietary testing techniques have been developed to characterize industry specific properties that are critical when interacting with modern forming fabrics.



PrimeCeramic AO

Premium Aluminum Oxide – Versatile and economical

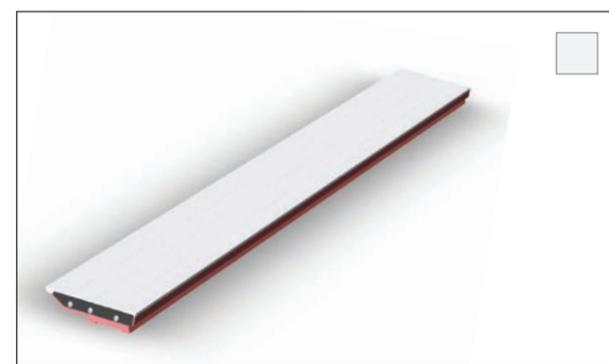
Aluminum Oxide has been widely used for most applications in the forming section of the paper machine for many years. The lower cost associated with alumina powder production and sintering power requirements versus other ceramic material choices provides Aluminum Oxide with a good cost to benefit ratio. Typical applications include well-lubricated sections of the forming section on slower machines.

APPLICATIONS

- Well-lubricated sections of the forming section on slower machines
- Machines without a large amount of abrasive materials as fillers

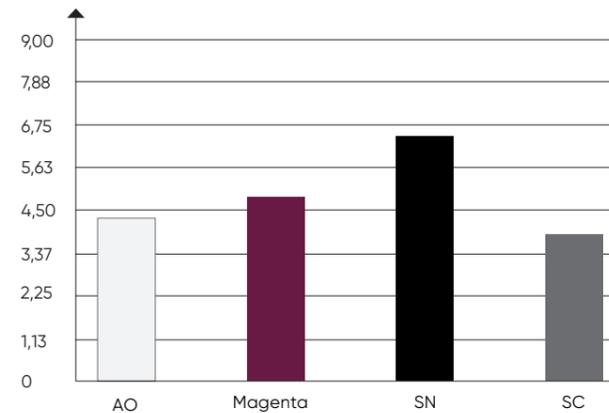
BENEFITS

- Good flexural strength and toughness
- Moderate hardness, elastic modulus and thermal conductivity



Forming board

TOUGHNESS COMPARISON



PrimeCeramic Magenta

A unique ceramic formulation specifically engineered for paper machine applications

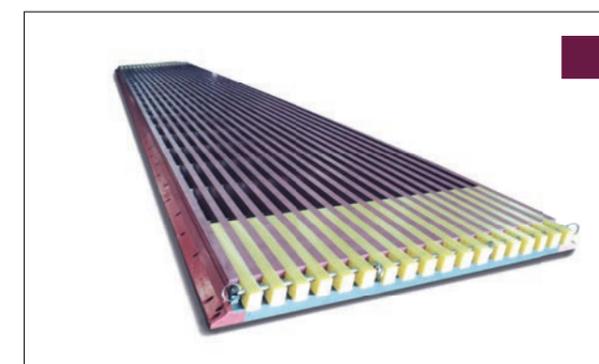
Magenta™ is a proprietary ceramic formulation specifically designed for use within the paper industry. Magenta's unique material properties significantly improve surface finish, making the material more gentle to fabrics significantly reducing drag wear. Magenta provides the papermaker with a material that will improve blade life in applications challenged by harsh furnishes and modern clothing designs.

APPLICATIONS

- Machine-proven in highvacuum positions with some of the world's harshest furnishes
- All Fourdrinier blades where a consistent doctoring edge is valuable for machine operation
- Suction boxes where low moisture can prematurely wear Aluminum Oxide-based materials
- High vacuum level Uhle boxes to improve felt life
- Magenta outperforms Silicon Carbide, in some highly abrasive markets

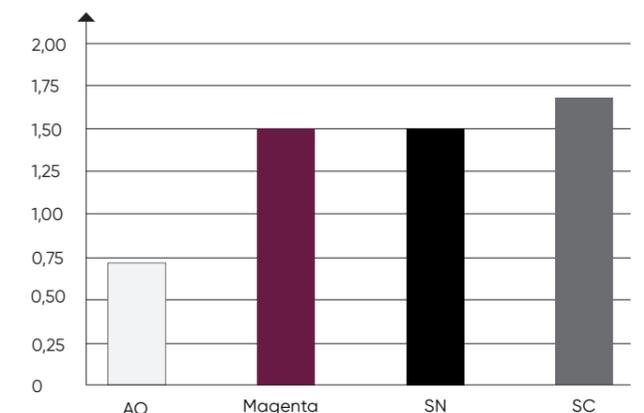
BENEFITS

- Wear and toughness properties greatly improve on Aluminum Oxide products without sacrificing hardness
- Blade profile is retained without developing sharp edges
- Improved surface finish makes the material more gentle by reducing fabric wear
- Extended blade life in applications challenged by harsh furnishes and modern clothing designs.



TriVac cover

WEAR RATE COMPARISON



PrimeCeramic SN

Silicon Nitride – Gentle to fabrics and excellent thermal shock resistance

Silicon Nitride is produced industrially in a variety of phases. ANDRITZ provides only the hardest, beta-phase Silicon Nitride for paper industry applications. Silicon Nitride ceramic is comprised of densely packed SiN rods, formed during the sintering process. This structure provides the geometry to generate the very smooth and dense surfaces that perform well on a paper machine.

APPLICATIONS

- Flexible material commonly used in multiple paper industry applications

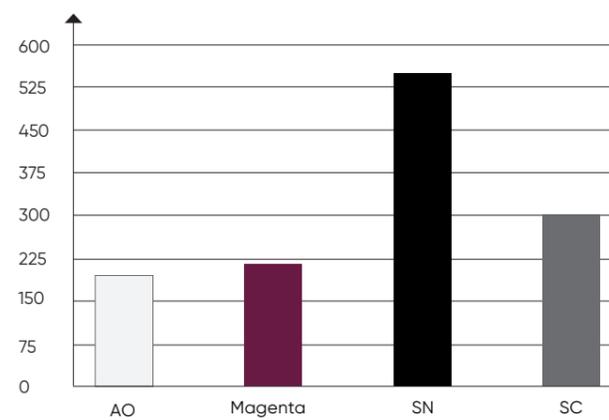
BENEFITS

- Great wear resistance
- Gentle to fabrics
- Excellent thermal shock resistance
- Tough - resists chipping



Forming shoe cover

THERMAL SHOCK COMPARISON



PrimeCeramic SC

Silicon Carbide – Ultimate high performance

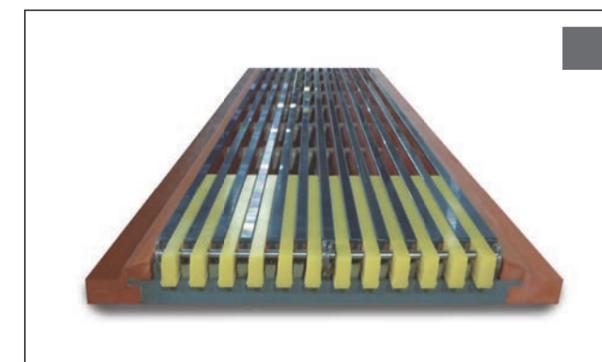
Silicon Carbide is the most widely used non-oxide industrial ceramic. It is commonly used for applications later in the forming process with less available lubrication and higher potential heat build-up and wear.

APPLICATIONS

- Applied later in the forming process subject to higher wear
- Good performance on higher speed machines and applications with more abrasive furnishes

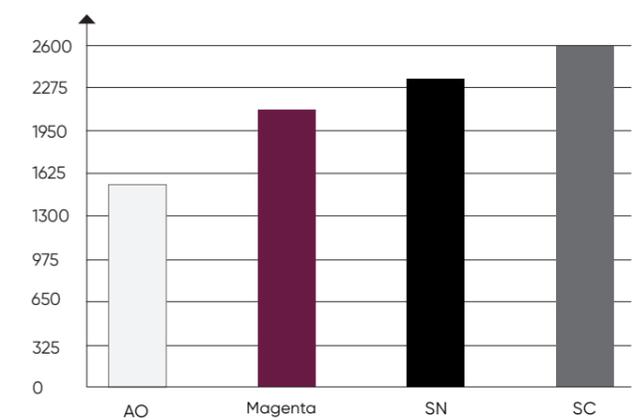
BENEFITS

- Highest wear resistance
- Very good thermal conductivity
- High toughness
- Moderate thermal shock resistance



DuoVac cover

HARDNESS COMPARISON





ANDRITZ *PrimeService* – IMPROVED EFFICIENCY AND PERFORMANCE

ANDRITZ SERVICE FACILITIES

ANDRITZ has a state-of-the-art service facility in North America providing our customers with the highest quality repairs and regrinds and fast turnaround times:

- Accurate and precise grinding
- Regrinding and repair service
- Replacement of individual segments or complete blade/covers

SERVICE ON SITE

ANDRITZ offers comprehensive on-site services:

- Preventive maintenance of ceramic dewatering elements
- Manual regrinding of the ceramic edges
- Regrinding of top ceramic surface (removal of wear marks)
- Ceramic segment replacement
- Levelling and checking of table elements
- Ceramic inspection
- Ceramic inventory management



Regrinding of ceramic foils in ANDRITZ facility

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