CORTEC CORPORATION

Environmentally Safe VpCI®/MCI® Technologies

USDA CERTIFIED BIOBASED PRODUCT
PRODUCT 69%

EcoShield® VpCI®-144 Barrier Paper, Patented
with 100% Recyclable Content (USDA Certified Biobased 69%)

DESCRIPTION

EcoShield® VpCI®-144 is the premium recyclable and repulpable moisture barrier corrosion inhibiting paper in the industry. It is coated with a water-based barrier coating and shows excellent oil and grease resistance. It also contains 69% USDA certified biobased content and is a qualified product under the mandatory federal purchasing initiative of the USDA BioPreferred® Program.*

Historically, polyethylene and wax coatings have been used to seal porous paper to provide a moisture barrier and/or moisture-vapor barrier. When coated this way, the resulting paper product is an environmental problem and cannot be recycled through normal channels. EcoShield® VpCI®-144 paper provides a competitive environmentally friendly alternative to polyethylene and wax paper, with comparable water vapor barrier properties. It is fully recyclable/repulpable into other types of paper products such as boxes, cardboard, and other corrugated materials.

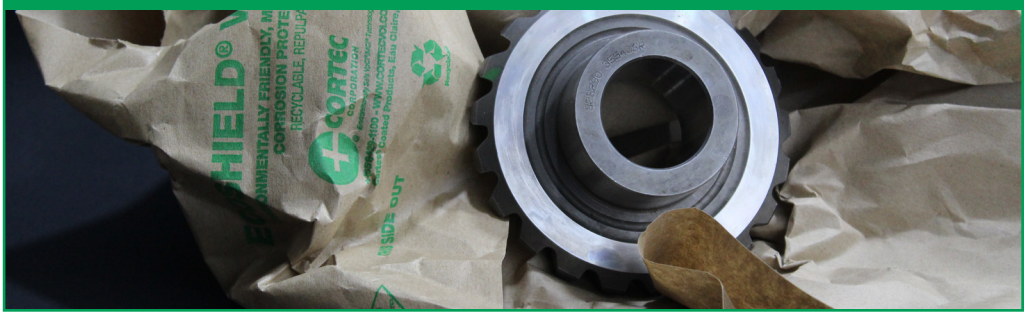
PACKAGING & STORAGE

Roll stock: 36" x 600' (91.4 cm x 182.9 m), 48" x 600' (12.9 cm x 182.9 m). Custom rolls and sheets available in a wide variety of sizes.

To ensure best product performance, store in original packaging, indoors, and out of direct sunlight at 40-100 °F (4-38 °C).

Shelf life: 2 years

HIGH PERFORMANCE VPCI® PACKAGING



FEATURES

- Combines corrosion protection, moisture barrier properties, oil and grease resistivity
- Fully repulpable according to Fibre Box Association Voluntary Standard
- Contains no nitrites, phosphates, silicones, chromates, other heavy metals, or toxic products
- One product protects against corrosion of ferrous and non-ferrous metals
- Passes TAPPI T 240 om-12 Repulpability Testing ***(See Table 1)***
- Commercially equivalent to military specifications MIL-P-3420E
- Meets MIL-STD 3010C (modified)**
- Conforms to NACE Standards TM0208-2008 and RP0487-2000
- Packaged parts do not need to be cleaned prior to coating or other surface finishing applications
- UNI 11743:2019 and the System of Evaluation Aticelca 501:2019 ***(See Table 2)***

TYPICAL APPLICATIONS

EcoShield® VpCI®-144 paper can be used to protect products for storage and shipment in a wide variety of ways: end closures for shipping tubes, insert strips for recessed areas in large packages, and sheet liners or separators between products. Typical applications are

- Metal production: coils, wire reels, plate, bar, etc.
- Metal forging and die casting: raw and machined forgings and castings
- Metalworking: stamping, sheet metal work, springs, bearings, fasteners, tubes, pipes, jewelry, silverware, etc.
- Finished products: engines, machinery, equipment, tools, hardware, appliances, instruments, motors, etc.
- Electrical and electronic: components, controls, printed circuit boards, etc.

B. BAVARIAN FNACE ET AL: "IMPROVING THE DURABILITY OF PACKAGING MATERIALS", MATERIALS PERFORMANCE MAGAZINE, NACE PUBLICATION, FEBRUARY 2021 ISSUE, PAGE 44-47.

***For more information about the BioPreferred® Program, go to http://www.biopreferred.gov.**

EcoShield® VpCI®-144 Barrier Paper, Patented

METALS PROTECTED

- Carbon Steel
- Stainless Steel
- Galvanized Steel
- Cast Iron
- Aluminum Alloys
- Copper
- Brass (≤30% Zn)
- Solder

TYPICAL PROPERTIES

Property	TAPPI Method	Unit	Cortec®
Basis	T-410	lbs/3000 ft² (g/m²)	48 (78)
Caliper (thickness)	T-411	mils (micrometers)	4.6 (115)
Tear - MD	T-414	g	47.5
Tear - CD	T-414	g	58.5
Dry Tensile - MD	T-494	lbs/in (kg/mm)	47.1 (0.84)
Dry Tensile - CD	T-494	lbs/in (kg/mm)	17.7 (0.31)
TEA-MD	T-494	ft-lbs/ft (J/m²)	1.9 (20.5)
TEA-CD	T-494	ft-lbs/ft (J/m²)	3.6 (38.8)
Stretch-MD	T-404	%	1.5
Stretch-CD	T-404	%	4.3
Ink Resistance	T-530	seconds	15
Smooth-Nonprint	T-538	sheffield	240
Smooth-VCI	T-538	sheffield	231
Internal Bond	T-541	ft-lbs/in (J/cm)	0.17 (0.064)
Abrasion-Nonprint	T-476	g loss/100 rev	0.007
Abrasion - VCI	T-476	g loss/100 rev	0.002

MD=Machine Direction
CD=Cross Direction

METHOD OF APPLICATION

Products should be packaged as soon after cleaning as possible. Keep the EcoShield® VpCI®-144 paper as close to the surface of the product as practical, leaving no barrier between the EcoShield® VpCI®-144 paper and the metal surface to be protected.

Standard construction of EcoShield® VpCI®-144: Neutral natural paper coated on one side with a water-barrier coating and on the other side with VpCI® material.

WATER VAPOR BARRIER PROPERTIES

EcoShield® VpCI®-144 compared with a comparable polyethylene coated paper (40# 3 msf paper, 6# PE Coating), and a commercial wax paper.

	VpCI®-144	Polycoated Paper	Waxed Paper
WVTR (g/hour•m²)	0.61-0.69*	0.47-0.71*	6.5-6.9**

Tested according to ASTM F1249, at 73 °F (23 °C), 50% RH
***** Tested according to ASTM E-96, at 72 °F (22 °C), 50% RH***

TABLE 1. REPULPABILITY ANALYSIS

Results*	Trial 1	Trial 2
% of Rejects	13.9	13.6
% Fiber Yield of Sample (85%)	86.1	86.4
Observe and note deposition on vessel walls, screens, moving parts, etc.	No	No
Deposition Observed? No If yes, detail below	N/A	N/A
SUMMARY		
Operational Impact	Pass	Pass
Yield	Pass	Pass

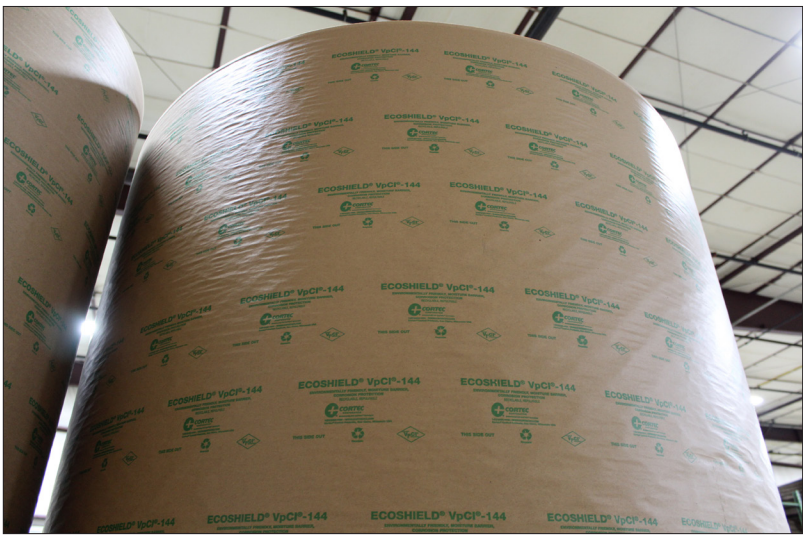
Methods and Notes:

TAPPI T 240 om-12 Consistency (concentration) of pulp suspensions

For dry/semi-dry sheet pulps, samples aren't diluted or filtered. Consistency is determined after equilibrating the entire sample (cut into specimens) in a sealed plastic bag for a minimum of one hour, two specimens are removed from the plastic bag and dried for a minimum of four hours.

FBA Voluntary Standard for Repulping and Recycling

The final pH for Trial 2 fell below 6.5



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QUALITY EXCELLENCE ®
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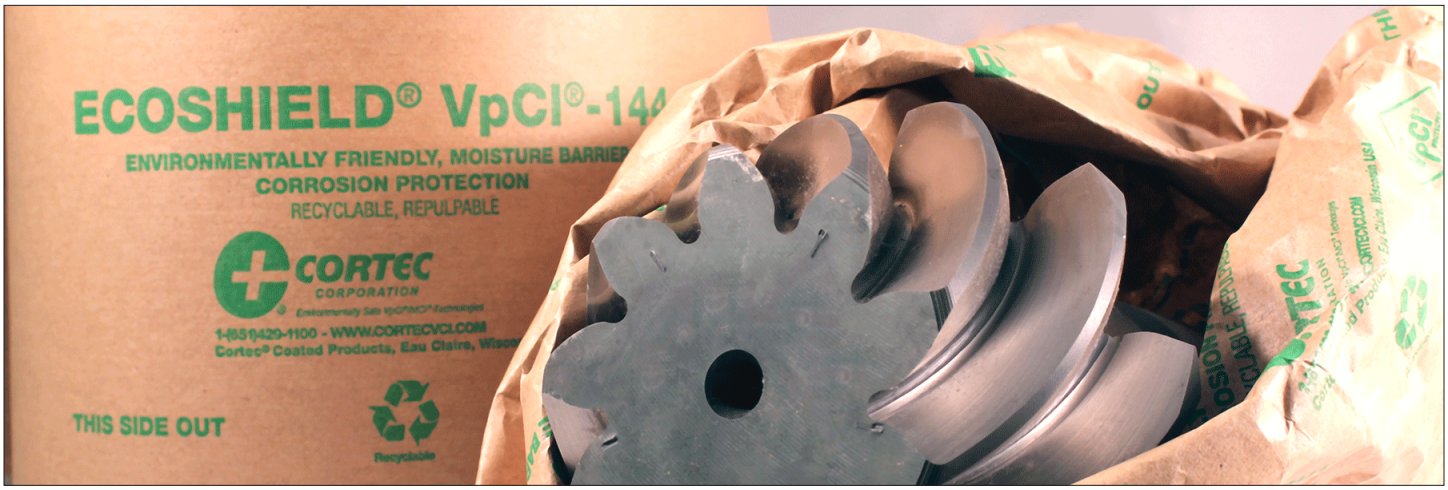
TABLE 2. RECYCLABILITY ASSESMENT SYSTEM RESULTS

Recyclability Assesment System Aticelca 501:2019	EcoShield® VpCI®-144 Recyclable with Paper				Polyethylene Coated Paper
	Level A+	Level A	Level B	Level C	Not Recyclable with Paper
Coarse Reject (%)	<1.5	1.5-10.0	10.1-20.0	20.1-40.00	>40.0
Area Macrostickies ø<2000 µm. (mm^2/kg)	<2.500	2.500-10.000	10.001-20.000	20.001-50.000	>50.000
Fibre Flakes (%)	<5.0	5.0-15.0	15.1-40.0	>40.0	
Adhesiveness	Absent	Absent	Absent	Absent	Present
Optical Inhomogeneity	Level 1	Level 2	Level 3	Level 3	



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ISO/IEC-17025 LABORATORY TESTING ACCREDITED

ISO 9001 CERTIFIED QUALITY SYSTEM REGISTERED

ISO 14001 CERTIFIED ENVIRONMENTAL SYSTEM REGISTERED

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