



Packaging Prototypes

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SAFI 

sustainable & alternative fibers initiative

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Photo by Adrian Dorst.



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Canopy is a solutions-driven environmental not-for-profit dedicated to protecting the world's forests, species, and climate. In collaboration with 1,000+ global brands, Canopy drives transformative action to eliminate the use of Ancient and Endangered Forests in packaging and textiles while scaling Next Gen solutions.

Canopy is supporting diversification of the pulp fibre basket to include alternatives to wood in order to address the problem that current market demand for forest products far exceeds a sustainable supply.

Next Gen Solutions, as demonstrated in this sample binder, use agricultural by-products and fibres instead of forests to make paper, paper packaging, and textiles.

By harnessing agricultural residues and other Next Generation alternatives, we can transform paper packaging supply chains, reduce financial and operational risk, and save forests all over the world. It's time to resize, redesign, repurpose, and add Next Gen fibres alongside more recycled content.



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SAFI, at North Carolina State University, is a global research initiative focused on developing and promoting conventional and alternative fibers for the pulp and paper industry. Its research explores innovative pulping processes, techno-economic feasibility, and the environmental carbon footprint of using non-wood fibers such as wheat straw, miscanthus, and hemp for tissue and packaging applications.

The impact of SAFI extends beyond scientific research, as it actively bridges academia and industry to accelerate the commercialization of sustainable fibers. As a result, SAFI is shaping the future of the pulp and paper industry by providing actionable strategies for reducing environmental impact, enhancing supply chain resilience, and fostering a more sustainable and economically viable fiber ecosystem.

NC STATE UNIVERSITY

UNBLEACHED KRAFT PULPS



30% Wheat Straw 70% OCC	
Basis weight (g/m ²)	222
Caliper (μm)	337
Tensile Index (N.m/g)	59.5
Short span compressive strength (N.m/g)	25.2
CMT (kPa)	588
Taber Stiffness (mN.m)	6.82



30% Miscanthus 70% OCC	
Basis weight (g/m ²)	223
Caliper (μm)	383
Tensile Index (N.m/g)	36.1
Short span compressive strength (N.m/g)	19.4
CMT (kPa)	405
Taber Stiffness (mN.m)	7.60

UNBLEACHED KRAFT PULPS



30% Whole Hemp 70% OCC

Basis weight (g/m ²)	213
Caliper (μm)	353
Tensile Index (N.m/g)	42.2
Short span compressive strength (N.m/g)	22.2
CMT (kPa)	410
Taber Stiffness (mN.m)	6.28



30% Hemp Hurd 70% OCC

Basis weight (g/m ²)	225
Caliper (μm)	355
Tensile Index (N.m/g)	44.7
Short span compressive strength (N.m/g)	23.4
CMT (kPa)	455
Taber Stiffness (mN.m)	6.77

UNBLEACHED CHEMI-THERMO MECHANICAL PULPS



30% Wheat Straw 70% OCC

Basis weight (g/m ²)	224
Caliper (μm)	407
Tensile Index (N.m/g)	42.6
Short span compressive strength (N.m/g)	20.6
CMT (kPa)	359
Taber Stiffness (mN.m)	7.55



30% Miscanthus 70% OCC

Basis weight (g/m ²)	227
Caliper (μm)	430
Tensile Index (N.m/g)	31.6
Short span compressive strength (N.m/g)	17.9
CMT (kPa)	369
Taber Stiffness (mN.m)	8.83

UNBLEACHED CHEMI-THERMO MECHANICAL PULPS



30% Whole Hemp 70% OCC

Basis weight (g/m ²)	215
Caliper (μm)	375
Tensile Index (N.m/g)	33.3
Short span compressive strength (N.m/g)	19.3
CMT (kPa)	284
Taber Stiffness (mN.m)	7.35



30% Hemp Hurd 70% OCC

Basis weight (g/m ²)	224
Caliper (μm)	381
Tensile Index (N.m/g)	34.5
Short span compressive strength (N.m/g)	20.7
CMT (kPa)	396
Taber Stiffness (mN.m)	6.96

UNBLEACHED SULFITE PULPS



30% Wheat Straw 70% OCC

Basis weight (g/m ²)	220
Caliper (μm)	370
Tensile Index (N.m/g)	47.3
Short span compressive strength (N.m/g)	22.6
CMT (kPa)	401
Taber Stiffness (mN.m)	8.24



30% Miscanthus 70% OCC

Basis weight (g/m ²)	222
Caliper (μm)	379
Tensile Index (N.m/g)	37.1
Short span compressive strength (N.m/g)	21.2
CMT (kPa)	390
Taber Stiffness (mN.m)	7.31

UNBLEACHED SULFITE PULPS



30% Whole Hemp 70% OCC

Basis weight (g/m ²)	218
Caliper (μm)	345
Tensile Index (N.m/g)	37.1
Short span compressive strength (N.m/g)	20.2
CMT (kPa)	392
Taber Stiffness (mN.m)	7.21



30% Hemp Hurd 70% OCC

Basis weight (g/m ²)	226
Caliper (μm)	354
Tensile Index (N.m/g)	55.0
Short span compressive strength (N.m/g)	27.2
CMT (kPa)	542
Taber Stiffness (mN.m)	7.94

OLD CORRUGATED CONTAINERBOARD (OCC)



100% OCC	
Basis weight (g/m ²)	228
Caliper (μm)	400
Tensile Index (N.m/g)	33.7
Short span compressive strength (N.m/g)	17.9
CMT (kPa)	306
Taber Stiffness (mN.m)	7.35

Notes

- Feedstocks were sourced from the US.
- Feedstocks from different regions/countries may perform differently.
- This binder was printed in 100% recycled paper.



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