



StarchTek Corp : **Revolutionizing the Protective** **Packaging Industry with** **Styrofoam Alternatives**

Starchtek, an engineering-driven company poised to transform the protective packaging industry with its cutting-edge sustainable technology




StarchTek Corp - <https://starchtek.com/>





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01

Chapter 1: The Need for Alternatives To Styrofoam



The Time Is Now

The URGENT need for alternatives to Styrofoam has become increasingly critical as governmental bans are being implemented to address environmental concerns. Styrofoam, or expanded polystyrene (EPS), is a petroleum-based plastic that is commonly used for food containers, packaging, and insulation. However, the detrimental effects it has on the environment have prompted an escalation in regulatory measures to reduce its usage and promote more sustainable alternatives.



Environmental Impact of Styrofoam

As awareness of the negative impact of Styrofoam continues to grow, it is imperative for industries and consumers alike to seek out and adopt eco-friendly alternatives that will help protect our planet for future generations. With the push for more environmentally conscious choices

gaining momentum, now is the time for innovation and collaboration to pave the way for a greener, more sustainable future.

1. **Non-Biodegradability:** Styrofoam is non-biodegradable and can persist in the environment for hundreds of years. This leads to significant waste management challenges.
2. **Pollution:** Styrofoam breaks down into small particles that can easily enter waterways, contributing to marine pollution. These particles can be ingested by marine life, leading to harmful effects on the ecosystem and the food chain.
3. **Resource Intensive:** Production of Styrofoam is resource-intensive, requiring significant amounts of petroleum and energy.
4. **Health Hazards:** Chemicals used in the production of Styrofoam, such as styrene, have been linked to health risks including cancer, neurological damage, and reproductive issues.

Governmental Bans & Regulations

Several governments worldwide have implemented bans or restrictions on the use of Styrofoam to mitigate these environmental and health issues:

1. **Local Bans:** Numerous cities and municipalities, particularly in the United States, have enacted local bans on Styrofoam food containers and packaging. Examples include New York City, San Francisco, and Seattle.
2. **Regulatory Frameworks:** The European Union's Single-Use Plastics Directive, adopted in 2019, includes measures to reduce the impact of certain plastic products, including Styrofoam, on the environment.
3. **State and National Bans:** Some states and countries have taken broader actions. For example, Maine became the first state in the U.S. to ban Styrofoam food containers statewide, effective from July 2021. Internationally, countries like Canada and India have also announced plans to phase out single-use plastics, including Styrofoam.

Promising Alternatives

1. **Plant-Based Materials:** Products made from corn starch, sugarcane, and bamboo are gaining popularity. These materials are often biodegradable and compostable.
2. **Mushroom Packaging:** Made from agricultural waste and mycelium, mushroom packaging is a sustainable and biodegradable alternative.
3. **Paper and Cardboard:** Innovations in paper and cardboard packaging are making these materials more durable and suitable for a variety of applications traditionally served by Styrofoam.
4. **Biodegradable Plastics:** Polylactic acid (PLA) and polyhydroxyalkanoates (PHA) are examples of biodegradable plastics derived from natural sources that can replace Styrofoam in many applications.

The StarchTek Trifecta Opportunity

The governmental-bans, environmental-problems, and consumer-demand is the trifecta opportunity for StarchTek licensees, partners, and shareholders. The perfect storm has arrived and StarchTek has the perfect technology; utilizing 75% of the most promising materials to replace Styrofoam.



02

Chapter 2: Introducing StarchTek Corp.



Environmental Impact of Traditional Packaging

The traditional packaging industry has long been known for its detrimental impact on the environment. From plastic waste clogging our oceans to excessive use of non-biodegradable materials, the environmental consequences of traditional packaging are clear.

Our Mission

At StarchTek, our mission is to develop and provide affordable, sustainable, starch-based plastic alternatives to reduce environmental impact. We are committed to delivering high-quality, eco-friendly packaging solutions that prioritize sustainability without compromising on performance.

Our Vision

Our vision at StarchaTek is to to be a global leader in eco-friendly packaging solutions and a catalyst for a plastic-free future leading the way in green packaging innovations, setting new standards for the industry and inspiring others to follow suit. We strive to be at the forefront of sustainable packaging technology, constantly pushing the boundaries of eco-friendly solutions.

Our Technology

StarchTek Corp proudly holds the exclusive rights to ten starch-related patents developed by Michigan State University (MSU). These patents encompass a range of groundbreaking advancements in the utilization and processing of starch, reflecting MSU's extensive research and expertise in the field. In addition to these secured patents, StarchTek has also filed thirteen provisional patents (appendix), indicating the company's ongoing commitment to expanding its intellectual property portfolio to be the forefront of starch technology.



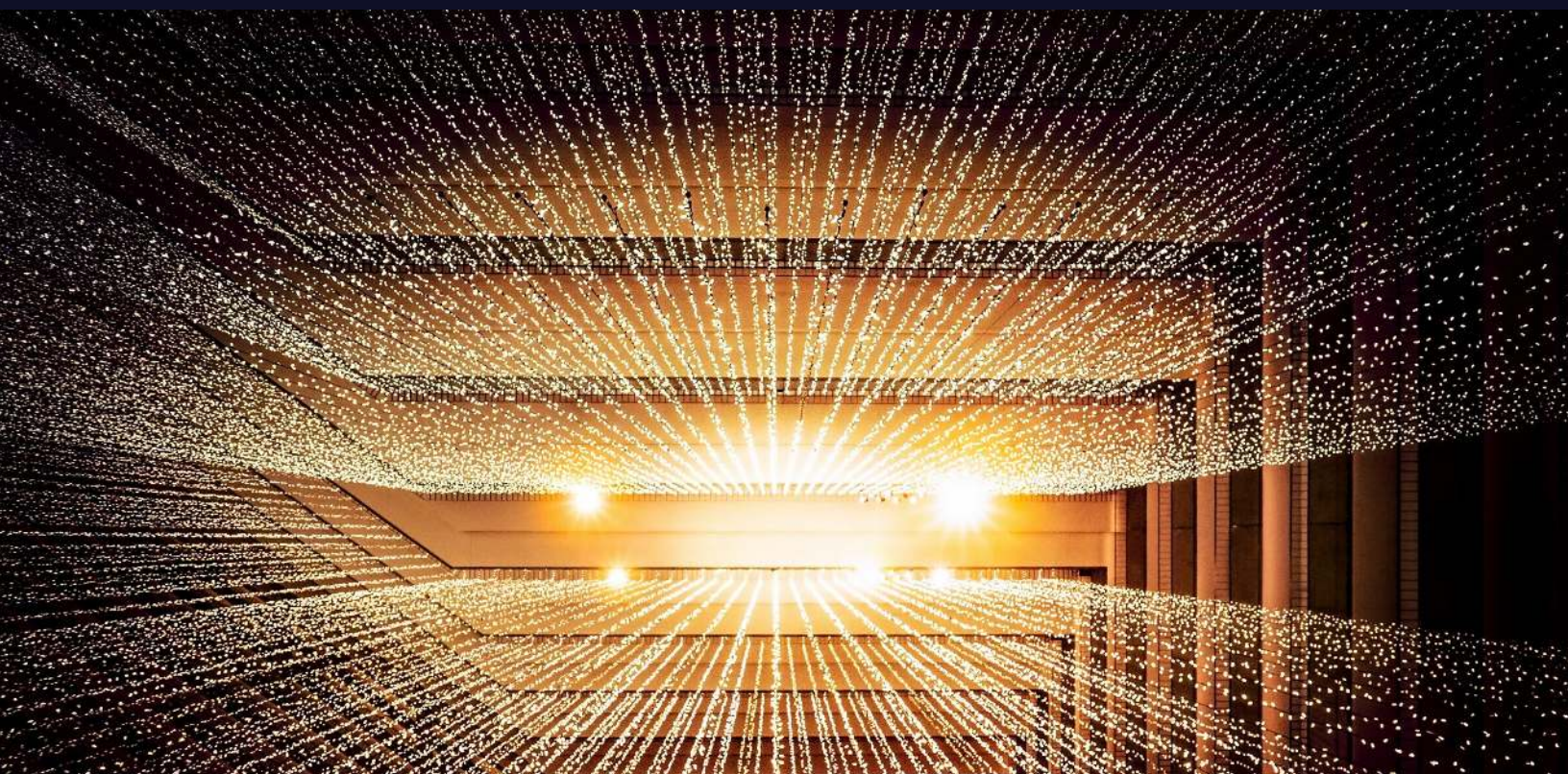
The Birth of The StarchaGator Mfg. System

PATENT PENDING US# 63/648,159

The idea for the StarchaGator manufacturing system was born out of a desire to provide the protective packaging industry with a turn-key sustainable manufacturing solution for our product offerings (page 13 &). Our team worked tirelessly to develop a system that could produce our multiple eco-friendly solutions (Appendix A-E), all while maintaining the high standards of quality and performance. The result is a cutting-edge patent pending system that is not only innovative, but also cost-effective and efficient. That's why we are thrilled to introduce the **StarchaGator On-Demand Manufacturing System**. Created with the environment and economics in mind, StarchaGator produces a range of our eco-friendly solutions, with its innovative modular 2 phase design and continuous throughput efficiency.

Innovation

We are dedicated to remaining at the forefront of innovation through our unwavering commitment to research and development. By integrating cutting-edge academic technology with our own innovation, we are able to consistently deliver cost-effective, state-of-the-art sustainable solutions to our valued licensees and partners. We are poised to lead the industry in sustainable and innovative starch technology into the future.





03

Chapter 3: StarchaGator's Innovative Technology



StarchaGator - US#63/648,159

The StarchaGator System, is comprised of several machines & processes and gets its name from its "brother", the Corrugator: A series of machines that combine different types of paper to create corrugated fiberboard.

The StarchaGator uses our proprietary chemical/mechanical technology known as "mechanochemistry". It entails a continuous 2-phase design that results in major cost saving. The outcome is a manufacturing system that produces affordable, effective, green packaging solutions, from "cradle to the grave".



The StarchaGator System

The StarchaGator offers a comprehensive solution with numerous modules specifically designed to optimize and streamline the manufacturing process. This includes a high pressure extruder, exclusive dies, laminator, a box cutting machine, as well as essential equipment like unwinders, cutters, stacker/bundler, platforms, and conveyors. With all these components seamlessly synchronized, the StarchaGator provides a turn key solutions for the packaging industry to adapt.

Standard StarchaGator

The standard StarchaGator model produces flat or round profiles that are convertible into multiple solutions with the StarchaWrap module, corner guard module, laminating module, and/or convertor module.

Module Options

1. **STARCHAWRAP MODULE:** A module has been developed to create a biodegradable bubble wrap alternative that is connected to the StarchaGator.
2. **CORNER GUARD MODULE:** A state-of-the-art automated module specifically engineered to produce environmentally sustainable corner guards for a wide range of industries, including furniture, appliances, and electronics.
3. **LAMINATING MODULE:** The module can be linked to the StarchaGator or be situated at a different location, like the customer's site. An automated module for bonding cellulose with starch foam, utilizing top and bottom unwinders and offering the option for single or double sided bonding.

4. **CONVERTOR MODULE:** The module is linked to the StarchaGator to produce StarchaFoam sheets that are 24" wide by 60" to 72" long. This module converts StarchaFoam sheets into boxes or panels for thermal and cushioning protection during transit. The module has the option to be linked to the StarchaGator or be situated at a different location, like the customer's site and straight into the fulfillment line.

Summary

The efficient modular design reduces transportation cost, inventory cost, and conversion cost by functioning as a 2-phase on-demand packaging system.

Key StarchaGator Manufacturing Features

1. **FORMULATION:** The ideal chemical combination and balance of starch, bioplastics, water, and foaming agents significantly impact the quality, efficiency, functionality, and economics of the final product. Our expertise in formulating the perfect blend of these components guarantees our partners flawless end products.
2. **EXTRUSION PROCESS:** The type of extruder, temperatures, speed, pressure, residence-time, screw-configuration, and formulation-feed have an affect in the extrusion quality.
3. **EXTRUSION DIE:** Cutting-edge technology is currently pending patent approval, designed to optimize material flow for achieving a sleek, flat surface that rivals plastic alternatives; Appendix - E.
4. **FORMING DIES:** After the extrusion process, various profiles such as L and U are formed and then cooled to achieve the desired shape.
5. **LAMINATOR:** A high-speed laminator is used to bond the top and/or bottom side of the starch-based foam to corrugated material with biodegradable fast-drying adhesive.
6. **UNWINDERS:** Continuous feeding unwinders are employed to supply corrugate rolls from both above and below the starch foam, resulting in a sandwich-like configuration: starch foam in the center with corrugate layers on top and bottom.



7. **CONVERTOR MODULE:** One of the key benefits of the StarchaGator is the module design concept. The StarchaGator is similar to a corrugator used in the paper industry, to manufacture corrugate; large StarchaFoam sheets are manufactured and shipped out downstream to convert into their specific product requirements (boxes, panels, guards, etc...). The on-demand manufacturing design lowers the cost to the end user and provides the option to merge the converted product with the fulfilment line to maximize efficiency.

8. **CONTINUOUS MFG:** In addition to its diverse product offerings, the StarchaGator is also known for its efficiency and reliability. This state-of-the-art machine is designed to operate continuously, seamlessly, minimizing downtime and maximizing productivity; 24/7. Its user-friendly interface makes it easy for operators to set up and monitor production, ensuring that businesses can meet their packaging needs with ease and confidence. With a StarchaGator companies can streamline their packaging processes and reduce costs without compromising on quality or sustainability.



9. **UPDATES:** StarchTek is committed to innovation and continuous improvement to the StarchaGator. The machine is constantly being updated with the latest technology and features to ensure that it remains at the forefront of the protective packaging industry. By partnering with StarchTek, partners can be confident that they are investing in current and future cutting-edge technologies that is dedicated to sustainability and excellence.

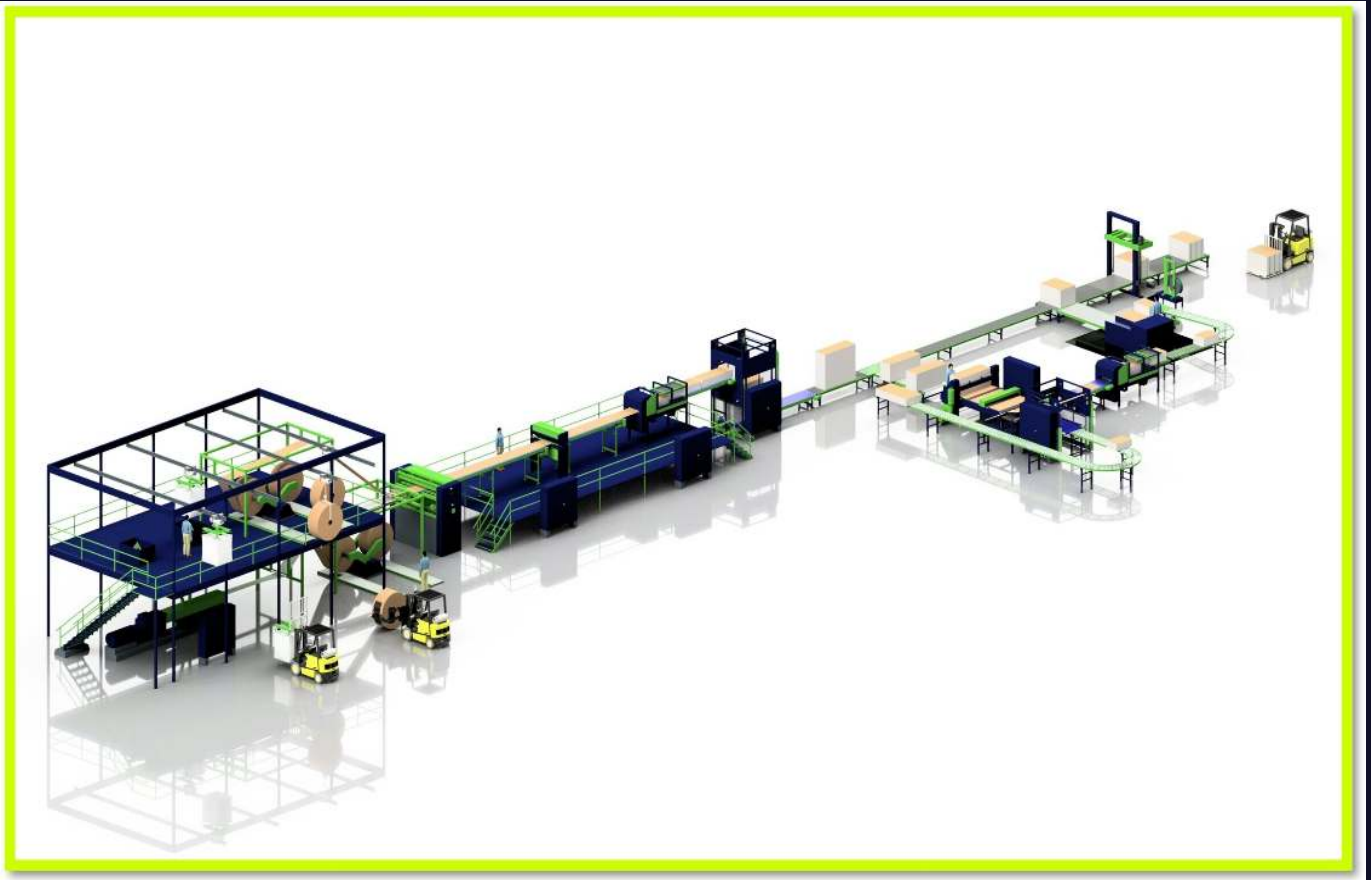
10. **COMPETITIVE PRICE:** Customer adoption is a function of affordability because most everyone loves "green" packaging, they just don't want to pay for it. **The StarchGator delivers to consumers affordable plastic free alternatives to Styrofoam.**

10 Product Offering

Our diversified product offering to multiple markets is a testament to our ingenuity, vision, and potential. We serve a wide range of industries, including furniture, appliance, electronics, home goods, medical, pharmaceutical, wine, food, meal kits, and general packaging protection. According to a Global Market Insight report from November 2023, the protective packaging market is projected to grow to \$55 billion by 2032. This anticipated growth underscores the increasing demand for innovative packaging solutions, positioning us strategically to capitalize.

Description lists	Biodegradable Corner, L-Shape, and U-Shape Guards: Appendix - A
Patent Number	US# 63/640,188 - US # 63/640,145 - US # 63/640,185
Markets	Furniture/Appliance/Electronics packaging
Description:	Biodegradable Round & Square Tubing: Appendix - B
Patent Number	US # 63/640,135 - US # 63/640,760
Markets	Furniture/Appliance/Electronics & Cold Chain
Description lists	Biodegradable Void Fill (Random Shapes): Appendix - C
Patent Number	US # 63/641,746
Markets	Corrugate Box Market
Description lists	Biodegradable Bubble Wrap - Appendix - C
Patent Number	US # 63/624,218
Markets	Thin Foam, Bubble Wrap, Surface Protector, Furniture, Electronics, and Cold Chain Markets
Description lists	Thermal Sheet, Recyclable 2 Piece Thermal Box, Insulation Board: Appendix - D
Patent Number	US # 63/449,192 - US # 63/641,378 - US #63/643,076
Markets	Cold Chain Passive Market and The Construction Insulation Market

StarchaGator With All Modules



OUTPUT Up to 2,000 Kg Per Hour (approximately 50K corner protectors per hour)

HEAD COUNT 6 TO 9 Per Shift

SPACE REQUIRED 20k Square Feet/1,900 Square Meters

NOTE These are only estimates at scale. Final results may vary.

Equipment/Price List

#	ITEM	Starcha Gator	Starcha Wrap Module	Corner Guard Module	Laminator Module	Conversion Module
MFG. EQUIPMENT						
1	EXTRUDER 80mm	\$850,000				
2	UNWINDERS		\$240,000		\$240,000	
3	CORNER GUARD CONVERTOR			\$250,000		
4	LAMINATOR				\$300,000	
5	2-PL CONVERTOR					\$350,000
	<i>Total</i>	\$850,000	\$240,000	\$250,000	\$540,000	\$350,000
COMPLIMENTARY EQUIPMENT						
6	MEZZANINE	\$50,000			\$25,000	
7	CONVEYORS	\$75,000			\$150,000	
8	PERFORATOR CUT-OFF KNIFE	\$125,000				
9	BUNDLER & STACKER	\$375,000				
10	UNITIZER	\$125,000				
11	DIES AND TOOLS	\$50,000				
	<i>Total</i>	\$800,000	\$0	\$0	\$175,000	\$0
OTHER						
12	PRE/TRANSIT/SET-UP	\$57,750	\$8,400	\$8,750	\$25,025	\$12,250
13	COST OVER-RUN	\$90,000	\$20,000	\$20,000	\$40,000	\$20,000
	<i>Total</i>	\$147,750	\$28,400	\$28,750	\$65,025	\$32,250
	TOTAL	\$1,797,750	\$268,400	\$278,750	\$780,025	\$382,250

- COST:** From \$1.8M to \$3.5M (licensing fees NOT included). The combination of the standard StarchGator, StarchaWrap, and Corner-Guard modules (\$2.35M), is the most efficient start. Add another \$400K for the one time license fee.
- PAYBACK PERIOD ON INVESTMENT:** 2 year
- RETURN ON INVESTMENT:** Investment Gain \$54M, ROI 1,080.00%, ROI/Annum 55.82%, Time 5.5 years
- NOTE:** These are projections based on current market conditions and assumptions.



04

Chapter 4: Sustainable Solutions by The StarchaGator



Biodegradable Packaging Options

StarchaTek, a leading provider of sustainable packaging technology, offers a wide range of biodegradable solutions that are not only environmentally friendly but also highly effective in protecting products during transportation and storage. With the rise of consumer awareness about the impact of traditional packaging on the environment, investing in biodegradable options is crucial for businesses looking to stay ahead of the curve.

Compostable Packaging Materials

Compostable packaging materials are a key component of sustainable solutions in the protective packaging industry. These materials are designed to break down naturally in the environment. Market adaptability is strongest in Europe but it is spreading globally.

Recyclable Packaging Designs

The importance of recyclable packaging designs cannot be overstated. At StarchaTek, we are revolutionizing the protective packaging industry with our innovative approach to creating eco-friendly packaging solutions that are both effective and curb-side recyclable.

In Conclusion

We are proud to offer our cutting-edge technology and we invite you to join us in our mission to revolutionize the protective packaging industry with starch-based sustainable solutions. Together, we can make a real difference in the world of packaging.



05

Chapter 5: Licensing and Partnership Opportunities



Collaborating with StarchaTek

One of the key advantages of collaborating with StarchTek is our knowledge and commitment to future starch based packaging innovations because we all believe the best technology is yet to come from StarchTek. When you partner with StarchaTek through the Technology Licensing or Partnership Program, you not only benefit from our proprietary technical expertise and use of our patents but you also benefit from priceless academia R&D; from renown universities that work with us.

Licensing Program

We offer a turn-key licensing program for the StarchaGator System designed to minimize scaling time with the support of our dedicated roll-out team. Alongside your StarchaGator capital expenditure, this program includes a one-time licensing fee for each component/module and monthly royalty payments. We are committed to your success, continuously working with you to reduce operational costs and maximize gross profits. Additionally, we provide updates on formulations and manufacturing processes as they are developed. The proprietary dies included in the licensing program must be returned to StarchTek at the end of the license term. This licensing program is ideal for integration with your current operations, allowing nearly all your gross profits to contribute directly to your bottom line.

Partnership Program

Our partnership program is design to work with packaging companies world wide and leverage our mutual assets. There is no need to recreate the wheel. Our program is design to leverage brand capital, manufacturing space, labor, financing, raw materials, and/or equipment. The partnership terms are unique to each situation and we look forward to your inquiry.

Potential Return On Investment - ROI



1. Investment Gain: \$54M
2. ROI: 1,080.00%
3. ROI/Annum: 55.82%
4. Time: 5.5 years

Investing in StarchTek technology offers the opportunity to capitalize on the growing demand for sustainable solutions in the protective packaging industry and benefit from the potential high returns that come with being early adopters .

One of the key advantages is potential for very significant financial returns. StarchTek partners and investors can gain a competitive edge in the market and capitalize on the growing consumer preference for environmentally friendly products.

In addition to the financial returns, investing in StarchTek also offers licensees and partners the opportunity to make a positive impact on the environment that will grow your brand capital.

In conclusion, partnering with StarchaTek is not only a smart financial decision, but also a meaningful step towards a more sustainable future.



Join the Revolution with StarchaTek

Are you ready to join the StarchTek revolution? With StarchTek, licensees and partners have the opportunity to be at the forefront of a movement towards eco-friendly packaging innovations. Together, we can create a more sustainable future, make a positive impact on the planet, and realize financial gains in the process. Let's work together to revolutionize the industry and lead the way towards a greener, more sustainable world. Contact us today to take the next step.



06

Chapter 6: Innovation Road Map



Road Map

The StarchTek innovation roadmap is a strategic blueprint designed to propel the company towards its goal of leading the sustainable packaging industry. The roadmap focuses on three core areas: manufacturing specialized dies, research and development, product diversification, and market expansion.

1. In the short term, the company is dedicated to developing the dies to manufacture and form non-round profiles to meet the needs of the furniture, appliance, and electronic markets.

2. Mid-term objectives include leveraging collaborations with research institutions and industry partners to drive technological advancements to eliminate one-time use plastics; **specifically one time fast-food styrofoam pollution.**

3. Long-term goals center on scaling production capabilities and establishing a global presence through our licensing and partnership programs.



StarchTek Innovation also plans to invest in continuous sustainability assessments and lifecycle analyses to ensure its products meet evolving environmental standards and customer expectations as well as cost reduction formulations, processes, and tools. By following this innovation roadmap, StarchTek aims to remain at the cutting edge of sustainable packaging solutions, driving both ecological and economic value.



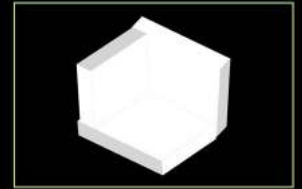
APPENDIX



Appendix A

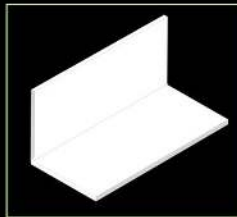
Patent Pending
US #: **63/640,188**

- **STARCHA CORNER GUARD**
- A biodegradable starch-based foam corner guard for cushioning



Patent Pending
US #: **63/640,145**

guard for cushioning protection



Patent Pending
US #: **63/640,185**

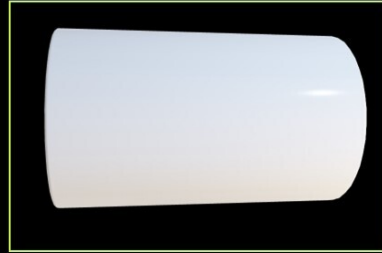
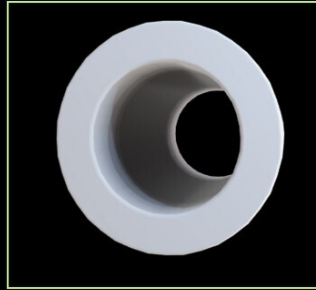
- **STARCHA U-EDGE PROTECTOR**
- A biodegradable starch-based U channel shaped guard for cushioning protection



Appendix B

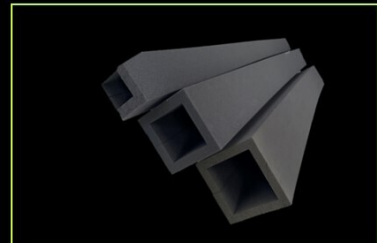
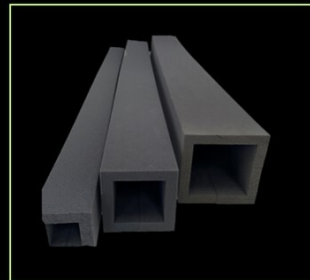
Patent Pending US #: 63/640,135

- **STARCHA TUBING**
- A biodegradable starch-based round tubing foam for cushioning and thermal protection during transit



Patent Pending US #: 63/640,760

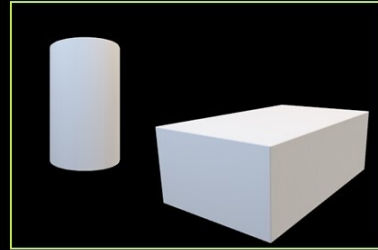
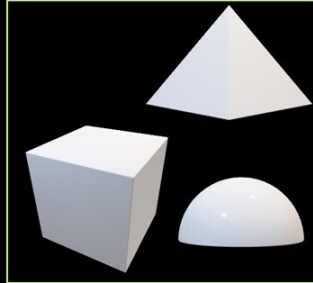
- **STARCHA SQUARE TUBING**
- A biodegradable starch-based non-round tubing foam for cushioning and thermal protection during transit



Appendix C

Patent Pending US #:63/641,746

- **STARCH VOID FILL FOAM**
- Biodegradable starch-based void fill shape fillers for shipping boxes



Patent Pending US #:63/624,218

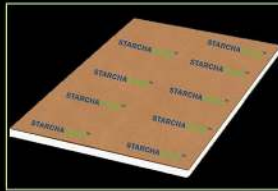
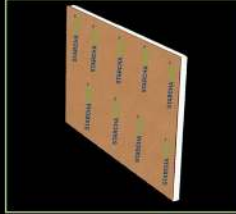
- **STARCHAWRAP**
- A novel & unique biodegradable smooth surface closed cell flat profile foam sheet



Appendix D

Patent Pending US #:63/449,192

- A BIODEGRADABLE STARCH-BASED CONTAINER BOARD FOR THERMAL AND CUSHIONING PROTECTION
- A biodegradable starch based board that can be converted into box and panel profiles with cushioning and thermal properties



US #: 63/449,192 (the trade name is StarchaFoam) is our first product designed. It is made from starch foam and cellulose/corrugate. The foam is extruded and converted into large sheets through a laminating process. These sheets are then turned into smaller panels, thermal coolers, thermal panels, corner guards, and other profiles through a second process. The second process can be operated either at the plant or directly at the customer's location, allowing for on-demand manufacturing.

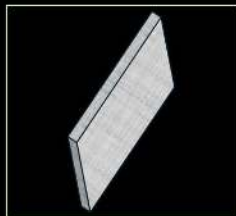
Patent Pending US #: 63,641,378

- STARCHA 2 PIECE BOX
- A biodegradable starch-based 2 piece box for cushioning and thermal protection during transit



Patent Pending US #:63/643,076

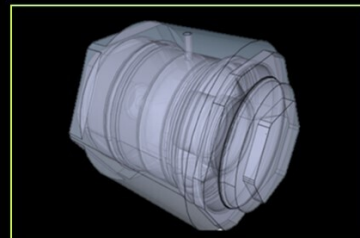
- STARCHA INSULATION BOARD
- A novel & unique biodegradable rigid insulation board for heavy duty thermal protection needs
- The patented manufacturing process is coming soon



Appendix E

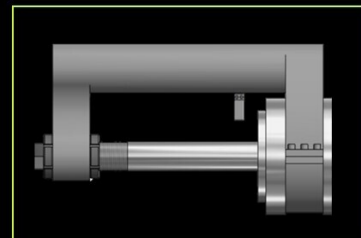
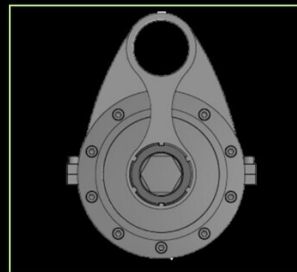
Patent Pending US #:63/607,100

- **SINGLE SPIDER ADJUSTABLE DIE LIP**
- A tool to extrude plasticized starch with minimal material flow obstruction and means to adjust the lip gap without stopping the process

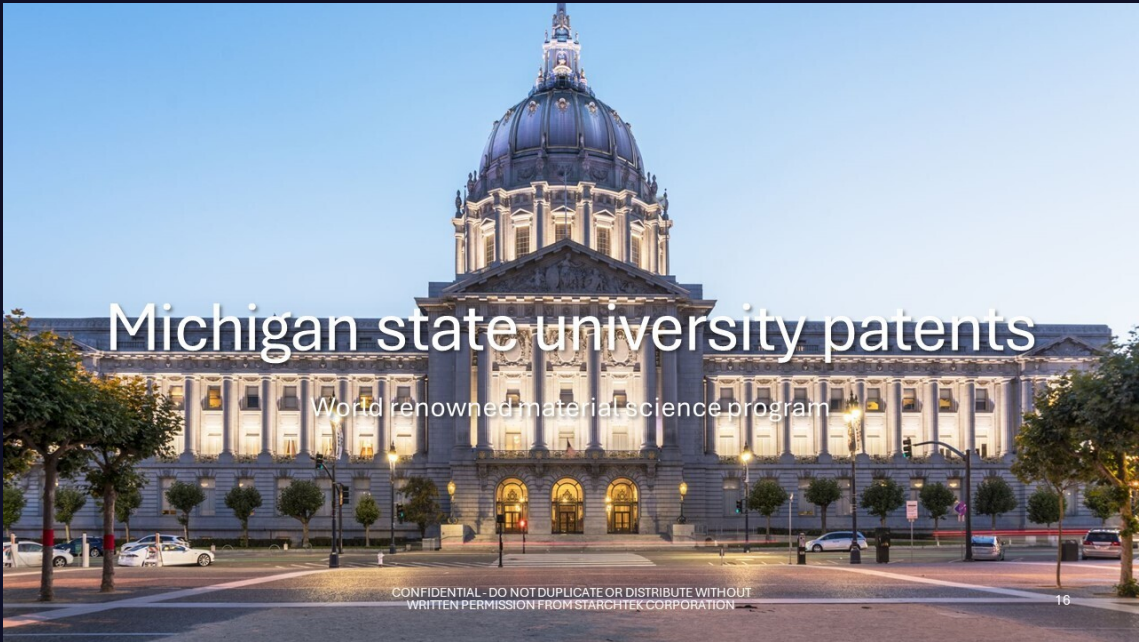


Patent Pending US #:63/609,242

- **EXTERNAL ADJUSTABLE MANDREL DIE**
- A spider less annular die for sheets that delivers zero material flow obstructions and on-demand gap adjustment while in process




Appendix F



Exclusive rights to 10 msu patents

EXCLUSIVE LICENSE AGREEMENT
AGR2021-00257

This Exclusive License Agreement (“**Agreement**”) is entered into, effective as of the date of last signature (“**Effective Date**”), between Michigan State University, a non-profit educational institution of the State of Michigan having a place of business at 325 E. Grand River Avenue, Suite 350, East Lansing MI 48823 (“**University**”) and StarchTek Corp., a Delaware Corporation having a principal place of business at 3911 Concord Pike, #8030, Wilmington, DE 19803 (“**Licensee**”).

	Serial Date	No./Filing Date	Patent Date	No./Issue Date	Country
Starch-Polyester Biodegradable Graft Copolymers and a Method of Preparation Thereof	US10/993,186	filed 11/19/2004	US7,629,405		USA
Starch-Polyester Biodegradable Graft Copolymers and a Method of Preparation Thereof	US12/592,996	filed 12/7/2009	US7,985,794		USA
Thermoplastic And Polymer Foams And Method Of Preparation Thereof	US11/131,565	filed 5/18/2005	US7,638,560		USA
Chemically Modified Plasticized Starch Compositions By Extrusion Processing	US10/993,309	filed 11/19/2004	US7,153,354		USA
Amphiphilic Starch-Polyester Biodegradable Graft Copolymers and the Methods of preparation Thereof	2007-505289		4634441		Japan
Chemically Modified Plasticized Starch Compositions by Extrusion Processing	2007-543163		4815448		Japan
Starch-Polyester Biodegradable Graft Copolymers and a Method of Preparation Thereof	1256-2006	filed 5/22/2006	48795		Chile
Starch-Polyester Biodegradable Graft Copolymers and a Method of Preparation Thereof	PA/a/2006/008134	filed 11/15/2005	287191		Mexico
Starch-Polyester Biodegradable Graft Copolymers and a Method of Preparation Thereof	MX/a/2011/000848	filed 11/15/2005	292683		Mexico
Starch-Polyester Biodegradable Graft Copolymers and a Method of Preparation Thereof	MX/a/2011/000849	filed 11/15/2005	294491		Mexico

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StarchTek Corp.

In the pursuit of Affordable Plastic Free
Solution Through Cutting-Edge
Innovation.

