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# UPM BIOCOMPOSITES

New level of composite performance

01 2014

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About UPM Biocomposites

UPM ProFi products

UPM Formi material

Appendix: References and case examples

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# Outdoor construction products and granulates for injection moulding

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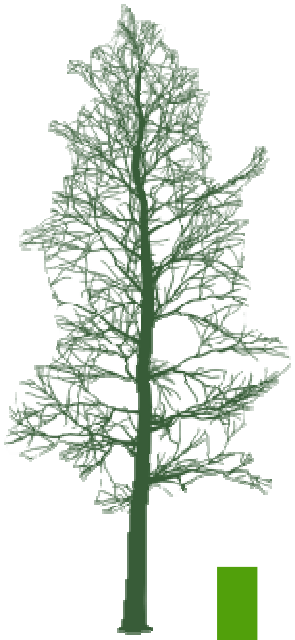

Lignin free cellulose fibres

Virgin polypropylene

UPM Formi granulates

Paper and plastic off cut

UPM ProFi outdoor products

Paper and laminate

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# Performance meets sustainability

- UPM ProFi and UPM Formi are cellulose based high quality composites based on UPM’s own research and development.
- New level of composite performance has been achieved by innovative material engineering.
- UPM ProFi composite gives new life to former waste. The products have superior outdoor performance.
- UPM Formi replaces unrenewable with renewable. The material provides superior features for acoustic applications.
- Both composites are PVC free and non toxic. At the end of their long life cycle they can be disposed of with energy waste or normal household waste

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- A composite is a combination of several materials where the materials function together but have not dissolved or been incorporated with each other.
- The essence of composites is the adaptability of their properties

# UPM Biocomposites in Brief 2013

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- One of Europe’s biggest natural fiber composite manufacturers
- Two modern factories; Germany and Finland
- Large scale R&D laboratory and team in Finland
- Several patents applied for innovations in material and production technology
- ISO 9001 and 14001 certified
- CE marking, FSC and PEFC certificates

# Award winning and recognized

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- Award winning product range and recognized architect co-operation projects
  - Green Good Design 2010 award
  - Sustainable Innovation Management Prize at Germany's Best Innovator 2010 Awards
  - Best product by visitors, France's leading landscape exhibition Paysalia 2009

- Recognized designer and architect co-operation projects
  - Artek Pavillion and 10-UNIT SYSTEM with Shigeru Ban
  - Venice Biennale with Tobias Rehberger
  - Shanghai World EXPO with Teemu Kurkela
  - Milan Design Week with Tom Dixon
  - Genelec M-series loudspeakers

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# UPM FORMI MATERIAL

# UPM Formi Composite
# Material properties

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- Stiffness and strength
  - good tensile and impact strength allows thin wall thickness in product design
- Processability
  - low shrinkage allows 4-5 x wall thickness in product design.
  - Easy to injection mould: existing machines and moulds, enabling the re-use of expensive tooling
- Friendly touch
  - natural, soft and warm surface quality
- Excellent colourability
  - uniform and strong colours


# UPM Formi
# Carbon Footprint

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UPM Formi has a 30-60 per cent lower carbon footprint than other comparable plastics such as virgin polypropylene, ABS and PC.

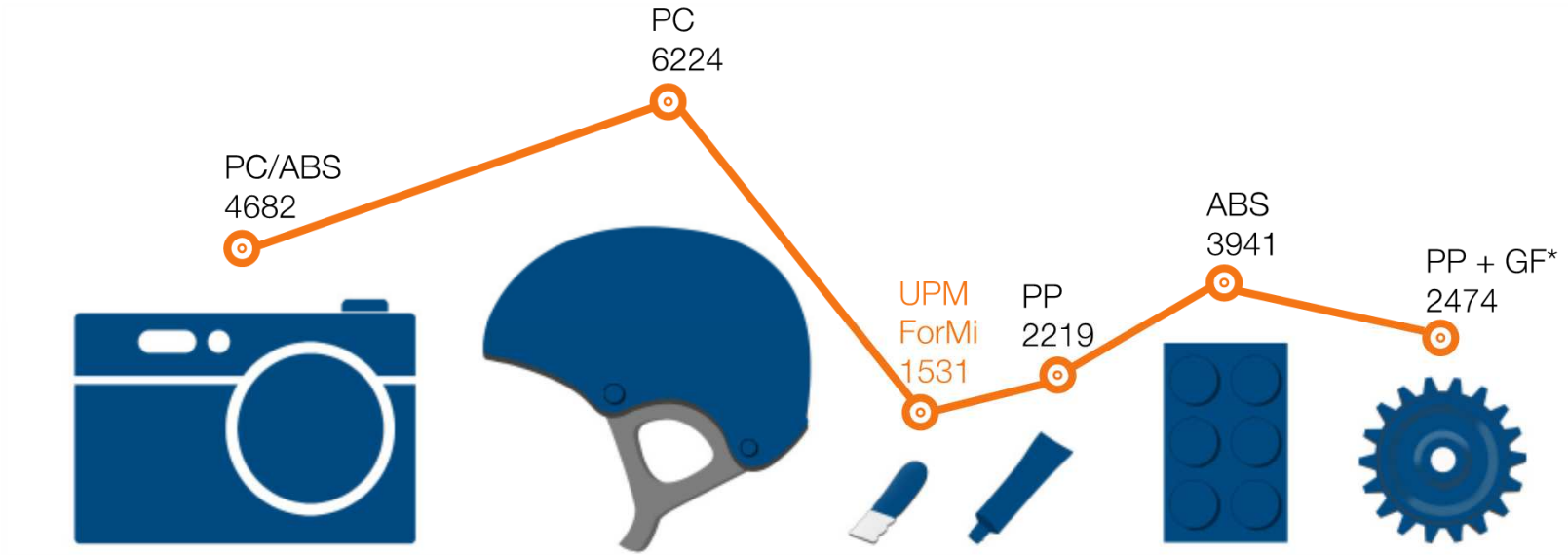


Figure 1

# UPM Formi
# Significant advantages in acoustics

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Loud speakers made from UPM Formi compared to traditional injection moulding materials

- Specific Modulus: up to 90% higher
- Dynamic Loss: up to 200% higher
- Natural Frequencies: up to 40% higher
- Carbon Foot Print: up to 70% lower

Loud speakers made from UPM Formi compared to MDF

- Total Cost: up to 84% lower
- Design: power back to the designer

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# UPM FORMI PRODUCT CASE STUDIES

## Genelec
## M-Series Speakers

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- UPM Formi decreases the carbon footprint of our product
- Using a composite instead of metals or MDF allowed us to play with the shape
- Consistent sound vibration dampening

**“We tested UPM ForMi’s acoustic properties for a long time and the results were consistently great”**

## Aurelia
## Aniara Speakers

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- UPM ForMi isolates the vibration and the sound needed for speaker applications
- A wall thickness 4 to 5 times thicker than ordinary plastics is achievable and ideal for acoustics
- Simplicity of plastic processing while offering the properties of wood

**“With UPM ForMi we can achieve a wall thickness 4 to 5 times thicker than ordinary plastics and this is why it is ideal for acoustics ”**

## Mika Ihanus
## Chopsticks

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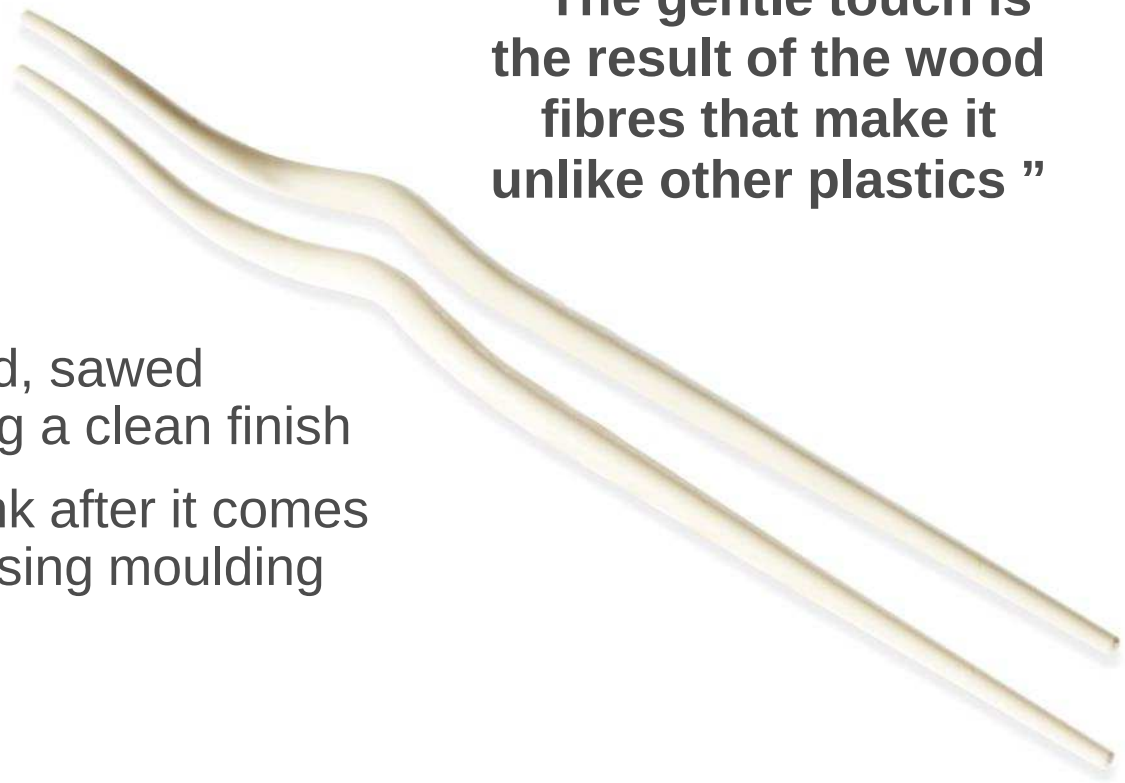
- Unique surface experience that feels gentle and natural as a result of the wood fibres
- Regulating heat creates a marble effect without the need for finishing
- Unlike standard plastics, UPM Formi can be milled, sawed and doesn’t melt, leaving a clean finish
- UPM Formi doesn’t shrink after it comes out of the mould, decreasing moulding times

**“ The gentle touch is the result of the wood fibres that make it unlike other plastics ”**



## Lower carbon footprint

- Kera Interior: Trek light, design by Tapio Anttila (thermoforming)
- Tregren: Genie Kitchen Garden, design by Sebastian Jansson
- Isku: Prima Series School Chairs
- Puustelli Group Oy: Kitchen Casing

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