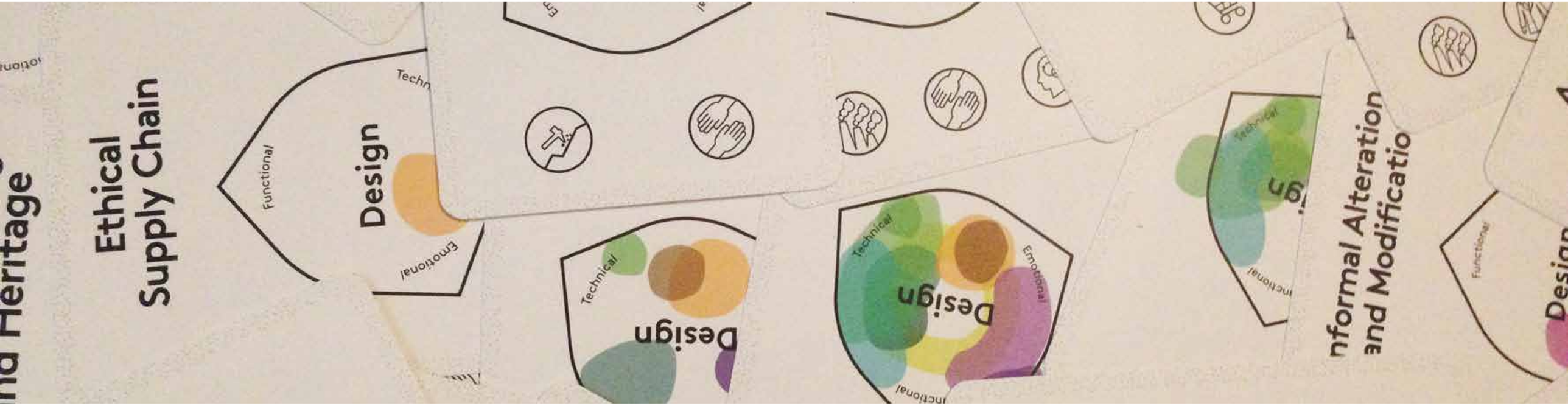
SUMMARY

Contextualizing sustainable textile product design - using Sustainable Design Cards and Material Pathways

Developed by:

design school kolding



Co-funded by the Erasmus+ Programme of the European Union

Introduction

The toolkit consists of 2 decks of cards:

Sustainable Design Cards: 28 cards
Material Pathways: 22 cards

The decks can be used to learn about sustainable design, the role of materials and approaches for interaction.

Background

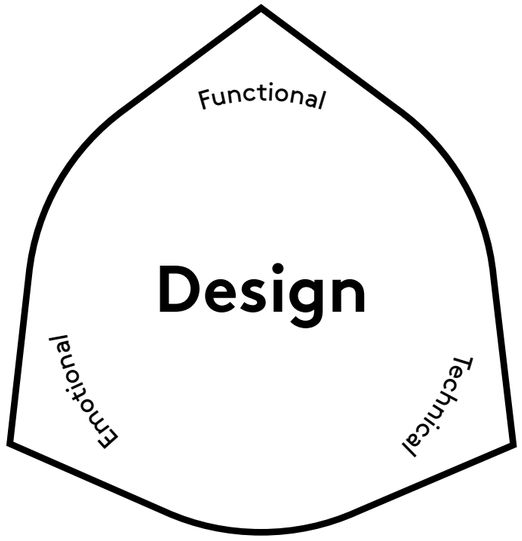
Product circularity =
in theory an indefinite circulation of resources which allows for unchanged consumption and use of resources

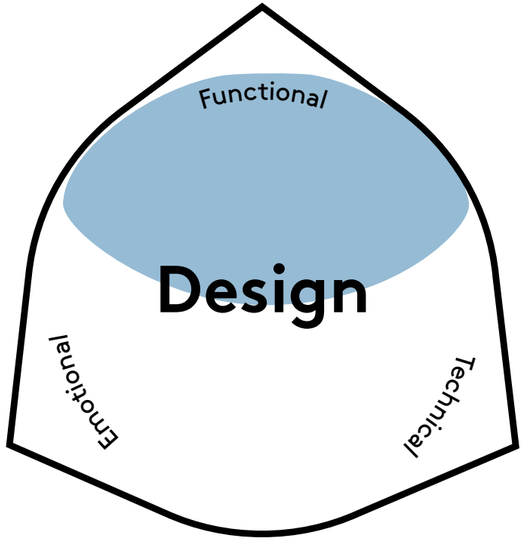
Product longevity =
prolong the use of products as long and efficient as possible through understanding the dynamics and variations of product lifetimes

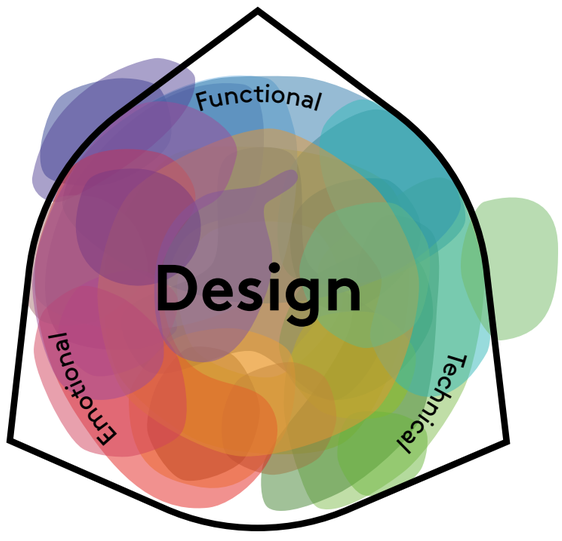
Multiple loops approach =
Application and combination of circularity and longevity

Product Lifetime

- Technical lifetime
- Functional lifetime
- Emotional lifetme



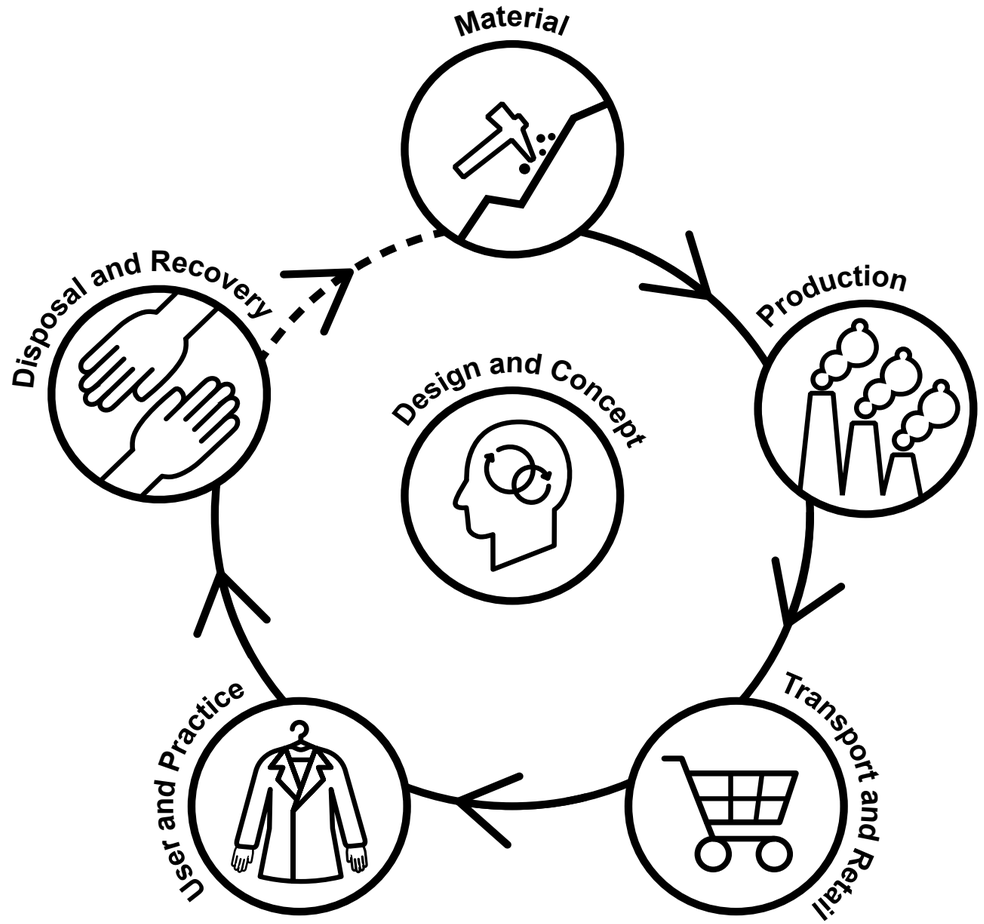




Left: The lifetime compass
Middle: The lifetime compass with the approach Multifunctionality

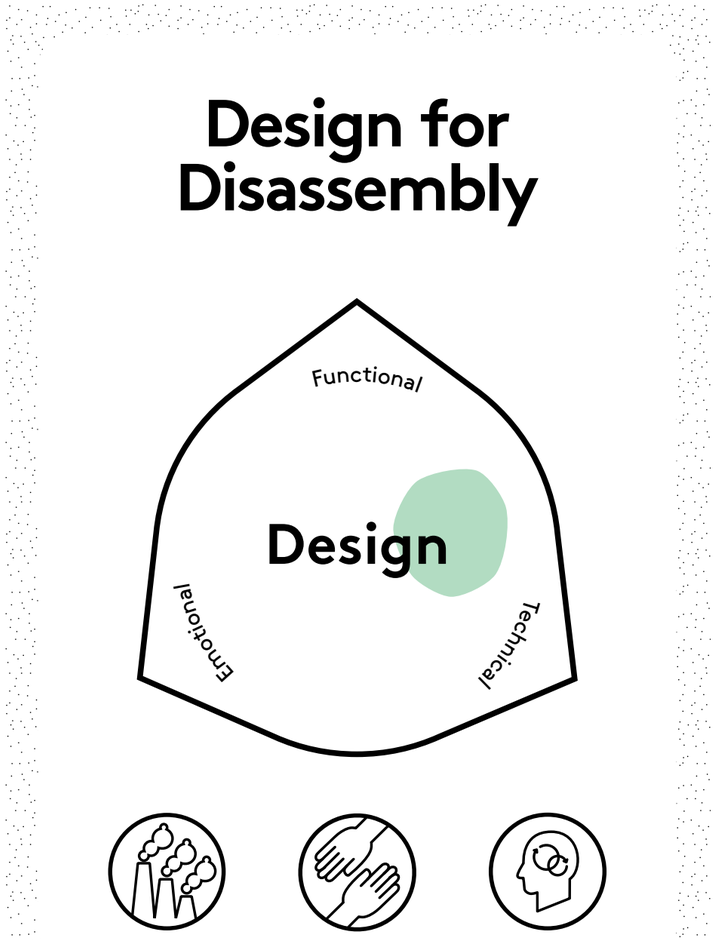
Right: The lifetime compass with all the approaches in the deck

Product Lifecycle



Product life cycle:
The product life cycle used for the Sustainable Design Cards and the Material Pathways

Card example: Sustainable Design Cards



Design for Disassembly

WHAT?
Working with materials in a manner that allows for material separation once product is discarded or in need of repair.

WHY?
Design for Disassembly can ease and support re-use of materials.

CHALLENGES
Design for Disassembly may challenge the intended design expression and/or economic considerations.

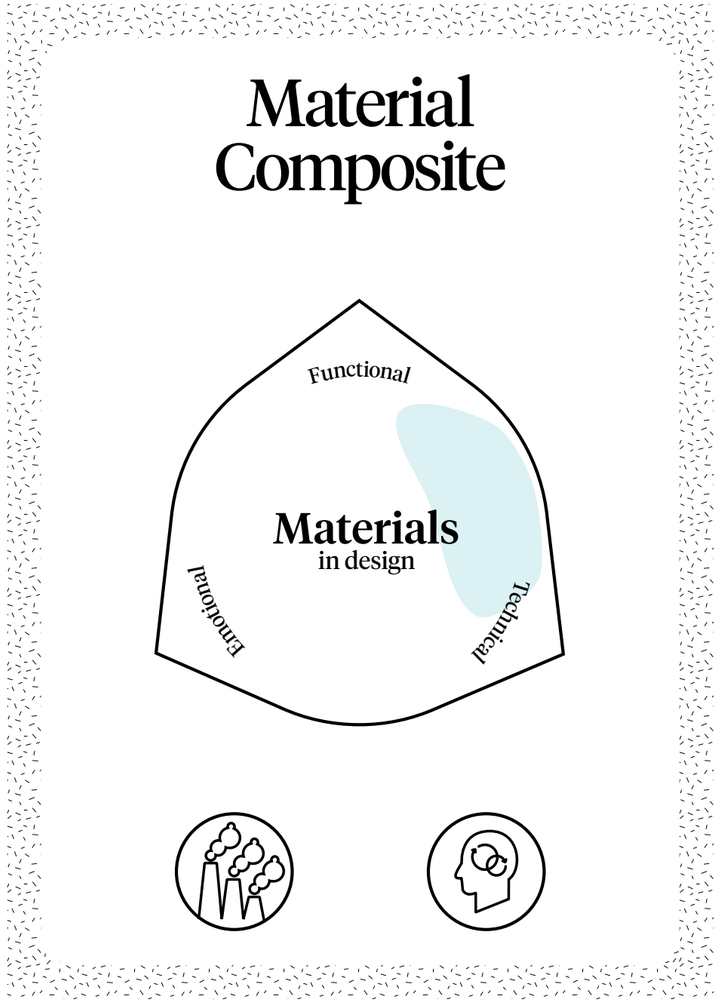
EXAMPLES
- Design that makes it **easy to remove and replace** product elements that wear out first. This is often seen with i.e. linings in coats, but can also be collars, sleeves or other exposed parts.
- Design that makes it easy for the user to **disassemble the product** and replace the exact broken part such as the Fairphone (www.fairphone.com).
- Design where materials can be **separated** and **re-used** or **re-cycled** after the product is fully discarded by the user, by avoiding e.g. glues and mixed fibre materials. An example is Herman Miller's Aeron chair.

THIS CARD LINKS TO
/ Modularity / Mono-Material / Upcycling

FURTHER READING
Bakker et al. (2014). **Products That Last – Product design for circular business models.** TU Delft, Delft, pp. 104-109 / Bogue (2007). **Design for disassembly: a critical twenty-first century discipline**, Assembly Automation 27 (4), pp. 285-289 / Vezzoli & Manzini (2010). **Design for Environmental Sustainability, Chapter 9: Facilitating Disassembly.** Springer, London, pp. 181-197.

Sustainable Design Cards
Navigation tool to work strategically with approaches to sustainability in design

Card example: Material Pathways



Material Composite

What?
Composites are materials made out of two or more distinguishable materials that each contribute with specific functions. In that way, it is possible to customise materials by combining materials with different properties. A commercial group of composites for product design is called Wood-Fibre Composites. These are predominantly made of renewable and degradable resources.

Why?
Composites make it possible to customise materials for specific applications, e.g. by high strength, low weight and durability. Furthermore, by working with the composition of materials, non-homogeneous and topology optimised materials can be obtained.

Challenges
- To utilise a composite's elements best, it should be developed for a specific product. This can make development time-consuming and costly.
- Composites are difficult to disassemble and thereby material recycling can be complicated.

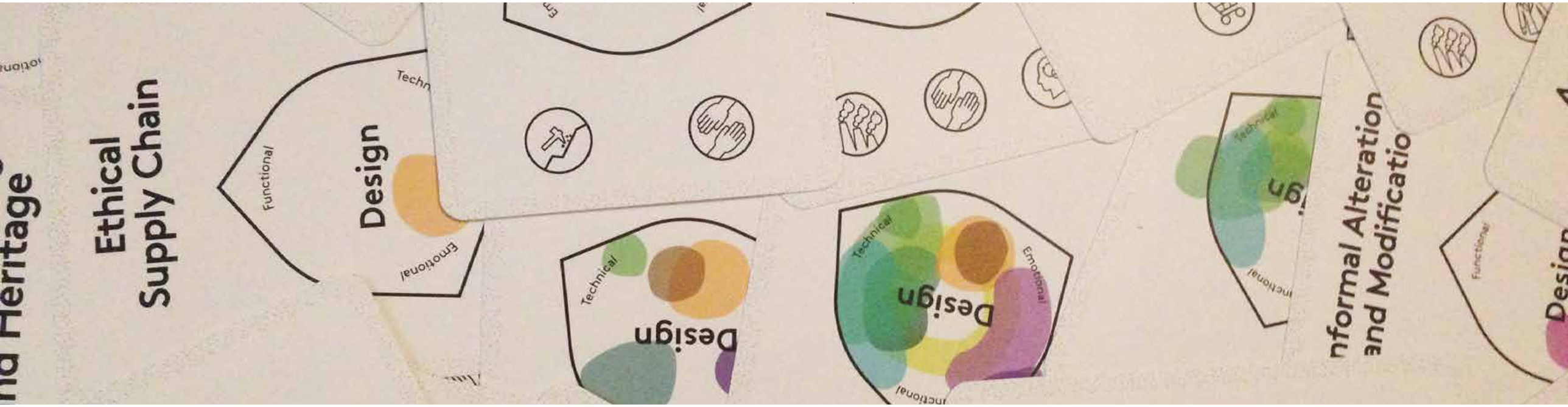
Examples
- Animal bones are made of hard and brittle hydroxyapatite and soft and flexible collagen.
- Most of the Airbus A350 XWB's wing and frame is comprised of lightweight carbon composites that due to the lighter weight, require less fuel to move.
- The core of the iconic Panton chair manufactured by Vitra is made of glass-fibre reinforced polyester.

This Card Links To
Material Biomimicry / Material Circulation / Material Degradation / Material Plurality / Material Substitution / Material Waste

Further Reading
Bunsell & Renard. (2005). Fundamentals of Fibre Reinforced Composite Materials. Series in Materials Science and Engineering. Taylor & Francis / Callister (2006). Composites (Chapter 16). In: Materials Science and Engineering, Wiley and Sons, pp. 577–620.

www.materialpathways.dk

This was a summary of an open educational resource. Please visit http://destexproject.eu/ to see the full amount of intellectual outputs of the project.



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