Guidance on design for longevity – denim

Extending the lifespan and use of garments is one of the most significant ways of reducing the environmental impact of clothing.

**Product overview**

- Denim encompasses not only jeans, but also denim jackets, dresses, shirts and skirts.
- Denim is naturally associated with longevity, both because it is a hard-wearing fabric – originally developed for workwear – and because discolouration and even damage that would be unacceptable in other garments is welcomed.
- Classic cuts using high-quality traditional denim or customised fitted and finished garments are generally kept for longer than high fashion pieces.
- Higher quality of raw materials, specialist finishes and construction methods can facilitate extended use and re-use.
- Unlike other garment categories, the price of denim does not always directly correlate with consumer expectations of wear.

**Top five solutions**

- Using ozone bleaching, laser engraving and resin finishes to create the desired effects with a lower environmental impact.
- Enhancing fabric strength and surface quality by applying sustainable dyeing, bleaching and surface treatments.
- Applying traditional, robust manufacturing methods and mass customisation strategies to products.
- Educating consumers about the unique characteristics of denim and how to care for it and repair, re-use or repurpose it.
- Creating emotional attachment through ethical sourcing and production, no waste and craft design approaches.

Extending the average life of clothes (2.2 years) by just three months of active use per item would lead to a 5-10% reduction in each of the carbon, water and waste footprints, and cut resource costs by £2bn.
What limits lifetime?

The fabric and component quality of denim garments has deteriorated over recent years due to demand for cheap clothing and easy care laundering.

- When garments are washed at too high a temperature, the colour can fade or the fabric thin, so they no longer have the desired appearance or feel.
- Cheaper denim, often made with blended fabrics, can become baggy through washing.
- Abrasion and fraying of denim fabric at key stress points (such as knees, elbows, hems and collars) can make denim look too worn.
- Element failure, such as the pocket coming unstitched or its lining tearing, or component failure, such as damage to a zips, rivets, fly buttons or fastenings, all reduce lifespan: items are more likely to be discarded than repaired.
- When fashions change, some garments are deemed unfashionable in terms of cut, style, colour or finish.

Around 30% of clothing waste ends up in landfill.

The waste footprint for clothing is estimated at 1.2 million tonnes, equivalent to 5% of UK household waste.
Recommendations on fibre and fabrics

The durability of denim products is directly influenced by fabric selection, manufacture, dyeing and finishing treatments.

- Denim with an unwashed weight of 12-14oz is generally deemed to offer the best durability for jeans.
- Factors such as twill design and steepness, and the use of other fibres (e.g. lyocell) and open-end or ring-spun yarns within fabric composition, can enhance durability and handle.
- New techniques such as laser engraving, enzyme and sustainable ‘ozone’ bleach treatments can create similar effects to stonewashing or sandblasting, but damage the fabric less.
- Resin fabric finishes can be applied to jeans to promote resistance to abrasion.
- Sustainably sourced and organic denim, and ethical manufacturing processes, offer a way to stand out in the market and increase user-product attachment.
- Zero-waste design approaches, that strategically incorporate otherwise wasted fabric into garments in order to reinforce physical durability, can lead to increased desirability.
- It is important to test fabrics for dry and wet rub, abrasion resistance, tensile strength, tear strength and seam slippage – and conduct similar tests on finished garments, including batch checking.
Recommendations on design and manufacture

Cut and choice of fabric and trims and method of manufacture have a significant impact on the durability of denim garments.

- Classic cuts and styles remain highly popular – in line with the overall narrative of longevity.
- There is a growing market for customised fits.
- Innovative cuts, finishes and surface treatments can create investment pieces that appeal to the high fashion consumer.
- Blue remains the most popular colour for denim, but buying patterns vary with the seasons; darker shades are more popular in autumn/winter.
- Coloured denim can be used as seasonal highlights that work with staple pieces.
- There is a wealth of knowledge to draw on in terms of manufacturing processes and technologies. For example, it is recognised that the multi-thread chain stitch 401 creates extensible seams which do not pucker and have inherent elasticity – ideal for close-fitting styles made from fabrics blended with elastomeric yarns.
- Key abrasion points such as knees, elbows and collars can be reinforced with extra fabric or surface detailing as a design feature – while also increasing longevity.
Recommendations on care and repair

Even though it is hard-wearing, washing and wearing affect the handle and appearance of denim. As consumers often have preferences about how ‘worn’ they like their denim to be, it is in the retailer’s best interest to assist them to achieve this.

- Care instructions on labels need to be specific to the design, dye and finish of the garment, and acknowledge the likelihood of continuous colour loss and other expected changes to appearance through wear and laundering.
- Colour loss can be minimised by washing inside-out, at low temperatures and with minimal detergent.
- Care instructions can also highlight that denim garments can be refreshed by airing or steam ironing between wears; they can also be dry-cleaned.
- Although wear marks and holes are often seen as part of the garment’s ‘history’, there is some interest in making minor repairs – such as patching, or replacing elements such as collars and pockets.
- Home repair kits – including correct-coloured yarn and thread, spare buttons and other components, as well as instructions – could encourage consumers to make small repairs themselves.
- As specialist skills and machinery may be required for more complex repairs and alterations, there is an opportunity to develop specialist aftercare services or identify companies to recommend to customers.

By encouraging home repairs and alterations garment longevity can be increased
Recommendations on re-use and discard

Denim’s longevity opens up a lot of opportunities for re-use.

- Garments can also be passed on as second-hand to friends and family or through donation to charity shops.

- There are also opportunities to resell garments online or through vintage outlets. Retailers can help raise awareness of this by providing advice on the labels and their websites about options for re-use.

- Garments can also be altered or re-styled as fashions change, or if parts of an item become unwearable. For example, jeans can be turned into skirts or shorts; alterations to seams can create more fitted or looser silhouettes; garments can be readily customised with patches or embellishments.

- There is potential for retailers to create significant value by offering or promoting specialist alteration services.

- Worn-out garments can be recycled. Using a single fabric facilitates recycling, but where multiple fabrics and components are used, there is scope for designers to make it easy to disassemble these, without compromising the robustness of the product.
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This is one of a series of Guidance Notes for product development teams offering guidance on design for longevity.

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