

## Carpet

Carpet is a decorative and hardwearing surface for floors. It is generally made in rolls that come in widths of 0.9 m, 3.66 m or 4.0 m installed over a prepared substrate. Carpet tiles are also available. Carpet can be made from wool, nylon, polypropylene, or natural fibre such as jute and hemp (or combinations of materials). Carpets made from a blend of fibres, such as 80% wool and 20% synthetic, are also available.

Wool carpet is a premium product that is natural, soft, durable and able to be produced in a range of colours and piles. Of the synthetic carpet fibres:

- Nylon is the most common. It can be dyed topically or dyed in a molten state (otherwise known as solution dyeing) or printed. It has very good wear resistance but can stain easily unless specifically treated (called filling of dye sites).
- Acrylic gives the look and feel of wool generally at a lower cost. It is moisture and mildew-resistant and not known to produce excessive amounts of static electricity. Most acrylic carpet is a loop pile construction.
- Polypropylene carpet yarns are lower cost. They are usually manufactured in the final colour as polypropylene is not easy to dye. It does not wear as well as wool or nylon.
- Polyester is used to manufacture spun and filament carpets. Polyester is stain resistant and colour is fused into the fibre. Polyester fibre has a tendency to crush or mat down, and is mainly used in mid to low end product.
- Sorona is a new polymer developed in the US derived from corn starch. Also known as 3GT or PTT, is a variant of polyester. It is similar to polyester, but has increased crush resistance and resilience due to the structure of the fibre. It is easy to clean. It is stain resistant because the colour is an integral component of the fibre – it is fused to it during manufacture. Sonora carpets are said to dry quickly and are mould resistant.

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Extraction and manufacture	
<b>Impact of extraction</b>	Wool is a natural, sustainable product. However, a key concern with wool production is the environmental impact of the scouring process.  The synthetic carpets are derived from petrochemicals.  The binding in woven carpet is usually cotton. and the weft is jute.
<b>Energy use</b>	Embodied energy is quoted as 106 MJ/kg for wool carpet, 95.4 MJ/kg for polypropylene carpet, 148 MJ/kg for nylon and 53.7 MJ/kg for polyester.
<b>By-products/emissions</b>	Dyes used to create some colours may contain heavy metals. Emissions vary from material to material, but as a rule emissions of CO <sub>2</sub> and other greenhouse gases are common in manufacture of petrochemical-based products.
Sourcing	
<b>Material sources</b>	Wool carpets are manufactured in NZ from NZ raw products.  Synthetic and blend carpets are manufactured in NZ from imported raw products, or can be imported fully manufactured.
<b>Availability</b>	Most carpets are readily available throughout NZ.
<b>Cost</b>	There is a wide range of costs and product specifications. Wool is usually more expensive than synthetic fibres. The cost of nylon carpet will directly reflect current oil prices.
<b>Transport to site</b>	Carpet is moderately heavy and bulky to transport on the roll. Single house-lots can usually be transported in a light vehicle.
Construction/installation	
<b>Health and safety during construction/installation</b>	VOCs may be emitted from adhesives and from chemicals used to give stain and insect resistance.

<b>Ease of construction/ installation</b>	Skilled installers are recommended. Carpet can be handled by site labour.
<b>Adaptability</b>	Carpet is easy to replace.
<b>Performance</b>	
<b>Health and safety during life of building</b>	Carpet can harbour allergens, dust and dust mites if not well cleaned. The health risk is compounded when petroleum-based adhesives are used to install the backing and carpet, as these can give off volatile compounds.
<b>Structural capability</b>	Nil – not a structural component.
<b>Durability*</b>	15-20 years – but depends on material quality and level of use
<b>Maintenance rating</b>	Medium – will require regular cleaning
<b>Moisture resistance</b>	Wool carpet and natural fibre underlay will rot if continually damp, synthetic fibres are rot resistant.
<b>Rot, mould and corrosion</b>	Carpets can harbour moulds and dust mites in damp environments.
<b>Thermal performance</b>	Carpet assists with thermal insulation but is not part of Building Code compliance for thermal insulation of floors. For heated floor systems, carpet will reduce efficiency of heat transfer from the floor to the room.  Applying carpet over concrete or other heavy mass flooring material reduces its ability to act as thermal mass.
<b>Sound insulation</b>	Carpet assists with sound insulation but is not part of Building Code compliance for sound ratings.
<b>Fire performance</b>	Fire performance depends on the carpet type.
<b>Waste disposal/recycling/re-use</b>	
<b>Re-use</b>	Good condition carpet can readily be lifted and reused.
<b>Recycling</b>	Wool carpets can be recycled into insulation products.
<b>Waste disposal</b>	Wool carpets will degrade. Synthetic fibres may degrade very slowly and give off low levels of toxins.

\* with normal maintenance