Industry Factsheet
Colours for the homes of people with ageing eyes or vision impairment

PEER REVIEWED

The aim of this factsheet is to assist service providers and tradespersons to select appropriate colours for the homes of people with ageing eyes or vision impairment.

This factsheet supplements HMinfo *Industry Checklist: Colours for the homes of people with ageing eyes or vision impairment*. Information contained in this factsheet serves only as a starting point. Application based on the information requires an understanding on construction principles, building codes and regulations. Service providers and tradespersons can benefit from the application when the safety and dignity of the consumers are respected in all phases of the design and construction process.

Ageing eyes or vision impairment and colour

Over time, some parts of the eyes (the lens and cornea, for example) can become denser or deteriorate, leading to blurry or partially blocked vision. Accident, trauma, tumour, stroke and/or genetics factors can also cause damage to some parts of the eyes resulting in impaired sight.

Vision impairment, through ageing or damage, can lead to decreased ability to recognise details. This detail is important for detecting obstacles or hazards and for noticing specific features of a place as reference points. Decreasing ability to recognise details can increase the risk of injury or for getting lost, and the reliance on others for support.

Various vision impairments or declining vision demand different colour-related solutions to make a home safer and more navigable. Home modification, which deals with the elimination or minimisation of barriers in an existing home environment, is closely connected not only to safety and navigability, but also to comfort and its psychological and social aspects. Appropriate colour and contrast combined with good lighting, support safer and more independent movement for older people and individuals with vision impairment.

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How to define suitable colours for the homes of people with ageing eyes or vision impairment

There are three attributes of colour that are important for people and their vision: hue, saturation, and brightness/ lightness.

- Hue is the attribute represented by the names that we commonly use to label colours that we perceive, such as red, green, blue, yellow, purple, brown, white, grey or black.
- Saturation indicates the purity of a colour. The more saturated a colour is, the purer it is. Colours classified as unique hues or 'primary colours' such as red, green, blue and yellow are examples of the most saturated colours. The most saturated blue, a primary blue, is purer than blue mixed with other primary colours such as greenish blue or reddish blue.
- Brightness or lightness signifies the amount of light reflected by a colour. The less light a colour reflects, the darker it appears. Dark blue reflects less light than light blue.

Examples of hue, saturation and brightness/ lightness are shown in Figure 1 below.

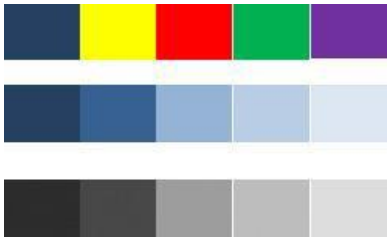

Figure 1: Examples of hue, saturation and brightness/ lightness

Australian Building Codes and Standards have colour requirements based on the brightness/ lightness attribute for supporting safe navigation of people with vision impairment. This difference in brightness/ lightness is also known as 'luminance contrast'.

Other Standards also use the term 'colour contrast' interchangeably with 'luminance contrast'; when in fact they are referring only to the brightness/ lightness attribute.

However, 'colour contrast' is not the same as 'luminance contrast'. 'Colour contrast' involves all three colour attributes - not just brightness/ lightness, but also hue and saturation.

Australian Building Codes and Standards suggest minimum values of detectable luminance contrast ranging from 30% to 60% depending on the type or function of the elements. Small or narrow elements such as texts or step edges need more than 60% luminance contrast to be well- detected by people with ageing eyes or vision impairment.

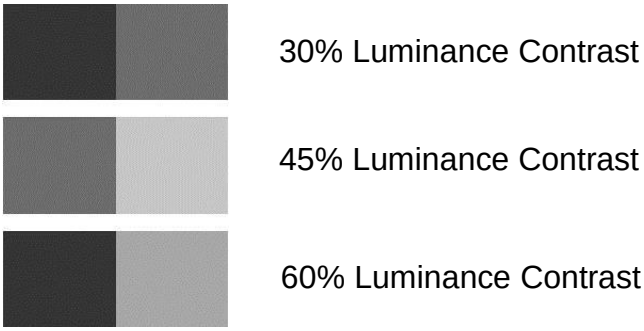

Figure 2 Luminance contrast, as indicated by Australian Building Codes and Standards combinations, possessing 30%, 45% and 60% luminance contrast (grayscale version)

Colour contrast can in a similar way be represented by a percentage of 'luminance contrast' - where a higher percentage indicates a higher contrast. The examples of good colour contrast for detection by people with ageing eyes or vision impairment are combinations of light colours with high saturation (such as bright white or yellow) against darker colours (such as dark red or grey).

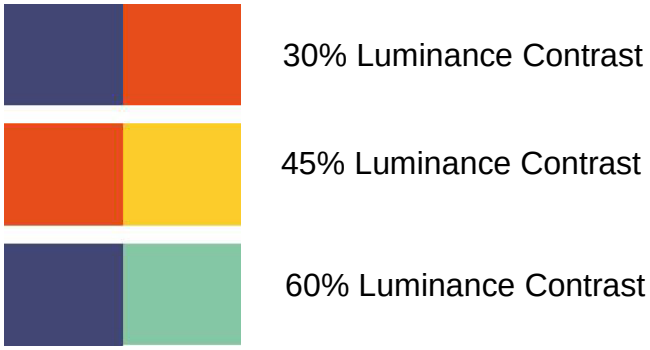

Figure 3 Colour Contrast with 30%, 45% and 60% luminance contrast
The examples in Figure 3 contain hue, saturation and lightness/ brightness.

It should be noted that the colour combinations shown on the paper version or computer screen may be different when applied in the real built environment, due to varying natural and artificial lighting. The results from computer or laboratory tests on luminance contrast should be confirmed with a field test.

An example of building elements possessing high and low luminance contrast are shown in Figure 4, below.

Both the difference of colour contrast between the white column and the red panel and then between the white column and the dark grey wall represent a luminance contrast of approximately 70%.

Low luminance contrast can be identified in the colour difference between the grey door and the dark grey wall and represents only 6% luminance contrast.

In this case, the door handle (on the left hand side of the photograph) is one of the features that can indicate the door's existence. The door handle has approximately 70% luminance contrast compared to the door panel.

Measuring the elements in the picture at different times with different lighting conditions is likely to give different values of luminance contrast to those reported here.

Figure 4 Colour combinations of building elements in the real environment presenting high and low luminance contrast

Source: Lukman, A. L. (2017). Developing Design Criteria based on Visual Perception of People with Vision Impairment Using Contrast Cues (Unpublished doctoral dissertation). UNSW Sydney, Australia.

Applying suitable colours in the homes of people with vision impairment

There are three broad strategies to use to help people with ageing eyes or vision impairment as much as possible in their homes.

1. Use Bright or Light Colours

Use bright or light colours for objects to help people with ageing eyes or vision impairment identify their existence, location and function. Bright colours make an object stand out from the surroundings. People with ageing eyes or vision impairment are then more likely to notice the object and recognise it.

2. Use Colour Coding

Mark an object(s) or feature(s) with certain colours, or group object together with a certain colour (for example, blue for bathroom objects; green for objects belonging in the kitchen) to help people with ageing eyes or vision impairment identify and remember the location and function of the object or feature.

This colour coding can be particularly useful for people with ageing eyes or vision impairment when an appliance or fixture has different features with a variety of functions, such as a clock, telephone, microwave oven, washing machine or basin. For example, different colours could be used for identifying which buttons are for turning on/off, for setting the temperature/time, or for controlling the water from the tap.

3. Use Colour Contrast

Use ‘colour contrast’ with a sufficiently high contrast so people with ageing eyes or vision impairment can visually detect elements in their home. This will help not only with their safety but can also help make their basic daily needs, such as personal care, meal preparation, cleaning and leisure easier.

The higher contrast a colour combination has, the more visible it is to people with ageing eyes or vision impairment.

Remember too, that colour ‘means’ different things to different people. Colours can have psychological, cultural and social aspects to them.

Check if the occupants want to use particular colours to make them feel better, perhaps in certain rooms, or on furniture, fixtures or appliances in their homes.

Where can I find more information?

- The HMinfo *Evidence Based Practice Review: Use of Colour for Safe Movement 2nd ed*., available from www.homemods.info
- Australian Standards:
  AS 1428.1-2009: Design for access and mobility - General requirements for access - New building work, and
  AS 1428.4.1-2009: Design for Access and Mobility: Means to assist the orientation of people with vision impairment-Tactile ground surface indicators.
- *National Construction Code Series 2016*, available from www.abcb.gov.au
- Other home modification resources on the www.homemods.info website

***This information was correct at time of printing.*