

Toilet design for visually impaired elderly persons

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Visual impairment

- Macula degeneration
- Glaucoma
- Cataract
- Diabetes
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Normal Vision



Macula degeneration



Glaucoma



Cataract



Diabetes



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Orientation

1. Know where you are
2. Find the way to the goal
3. Understand when you have reached the goal

Requirement for orientation

- General view of the environment
- Landmarks (beacons) in the environment
- No confusing parts in the environment
- Reduced the number of risks

Statement (1)

Many visually impaired have difficulties to observe the differences on

colours

OR

some colours

Statement (2)

- No recommendations of colour or colour combinations.
- The most important things are the combination between black and white in the environment

How to facilitate the orientation

- Using contrasting colours
- Most important for visually impaired is using lightness contrast
- Using a “sufficiently” level of illumination

Two simple and important tools

- NCS scale
- Luxmeter

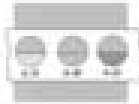
NCS scale

Using the differences in the grey scale

NCS scale



Lightness
meter



NCS lightness meter
Measurement of visual lightness. Place the central top of the sample of which the lightness is to be determined. The instrument covers the sample and the part of the meter glass to vary in distance. When the viewing is vertically correct, the gray scale the sample is fixed at a gray scale level. Read of the instrument indicates lightness (L) lightness value.

NCS Helligkeitsmesser
Messung der Helligkeit. Das Helligkeitsmesser soll das visuell empfundene Helligkeitsmaß (L) eines beliebigen grauen Abtönungs- und des Grauwertbereichs des Helligkeitsmessers genau anzuzeigen. An der Stelle, an der die Probe zu messen ist, wird das Helligkeitsmesser durch den grauen Abtönungs- und Helligkeitsmesser (L) und die NCS Helligkeitsmessung in einem Grauwertbereich.

Indicateur de clarté
Mesure de la clarté. Place l'échantillon au centre de la partie supérieure de l'instrument. L'instrument couvre l'échantillon et la partie de l'échelle de gris de l'appareil, avec laquelle on peut varier la distance. Lorsque la vue est verticalement correcte, le gris de l'échelle de la couleur est fixé à un niveau de clarté. Lire de l'instrument indique la clarté (L) la clarté valeur.

Ljuchtmätare
Mätning av ljuchet. Ställ provet i mitten över glasets topp och låt instrumentets ljuchtmätare och den gråa skalan på avstånd. När synen är vertikalt korrekt, är gråskalan fast på ett bestämt ljuchetsvärde. Läs av instrumentet för att få ljuchetsvärdet (L).



L	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1
L ₁	4.47	6.19	8.47	11.27	14.51	18.01	21.64	25.39	29.22	33.14	37.12	41.14	45.20	49.27	53.34	57.41	61.47	65.50	69.51
ΔE ₁	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

L = Lightness value (Helligkeitswert) / valeur de clarté (Ljuchtvärde)
 L₁ = Luminance value (Lichtwert) / [Lichtintensität] / la valeur de luminance (Luminositätsgrad)
 ΔE₁ = Munsell color difference (Farbunterschied) / NCS Helligkeitsmessung des Grauwertes / Unterschied de la couleur NCS dans les échelles de gris / ΔE₁ (Spektralabgleichung) / Spektroskop

Using NCS scale

1. Put the lightness meter on the test surface you wish to measure
2. Determine which of the lightness meters grey samples corresponds best with the test surface. Peer with your eyes.
3. Read the v factor
4. Repeat 1, 2 and 3 for the other test surface
5. A difference in 0,40 or more is acceptable for visually impaired

Luxmeter

- Measuring the illuminance in Lux
- Recommended level 300 lux in rest rooms for the elderly

Luxmeter



The way to the rest room

- Orientation assistance in the floor
- Remark the red doors in the end of the corridor





Stairs



Recommendations (1)

- Choose material with high lightness on walls with windows and the window frame to decrease the risk for dazzling from the windows.
- No big mirrors but

Entrée



Recommendations (2)

- Use different light-ness contrast on

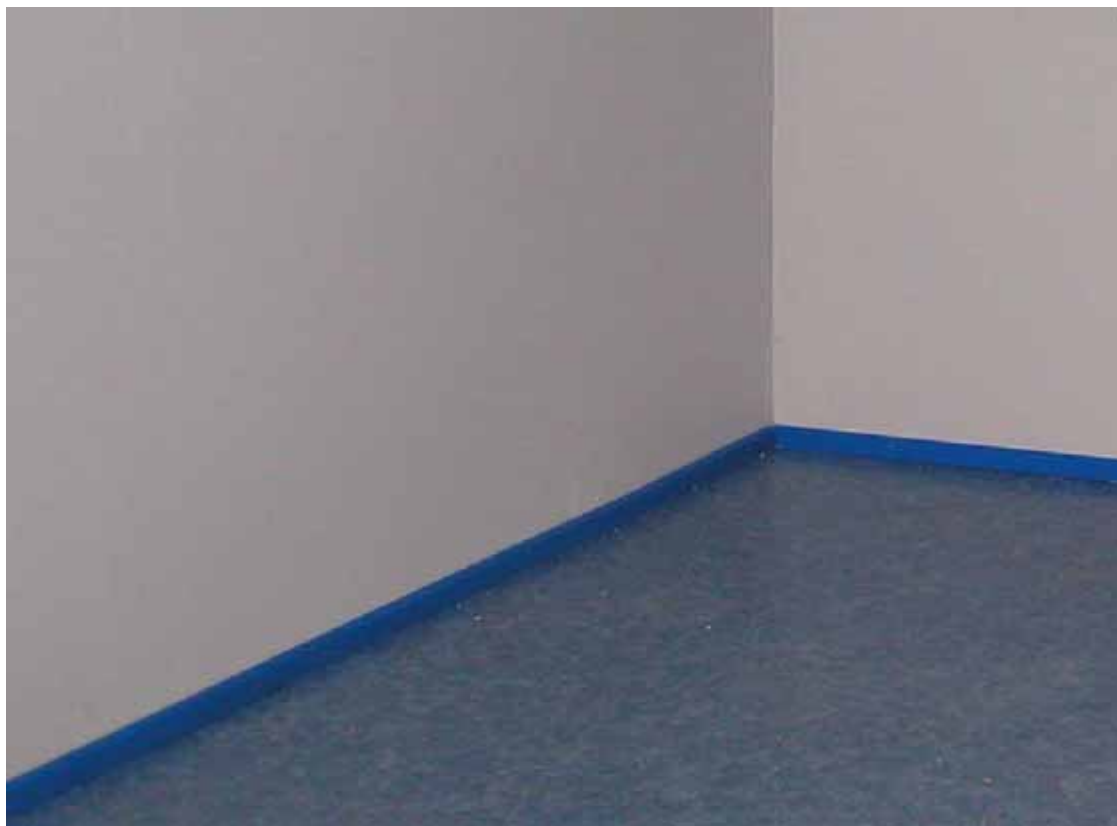
door - door handle

wall – door frame



Recommendations (3)

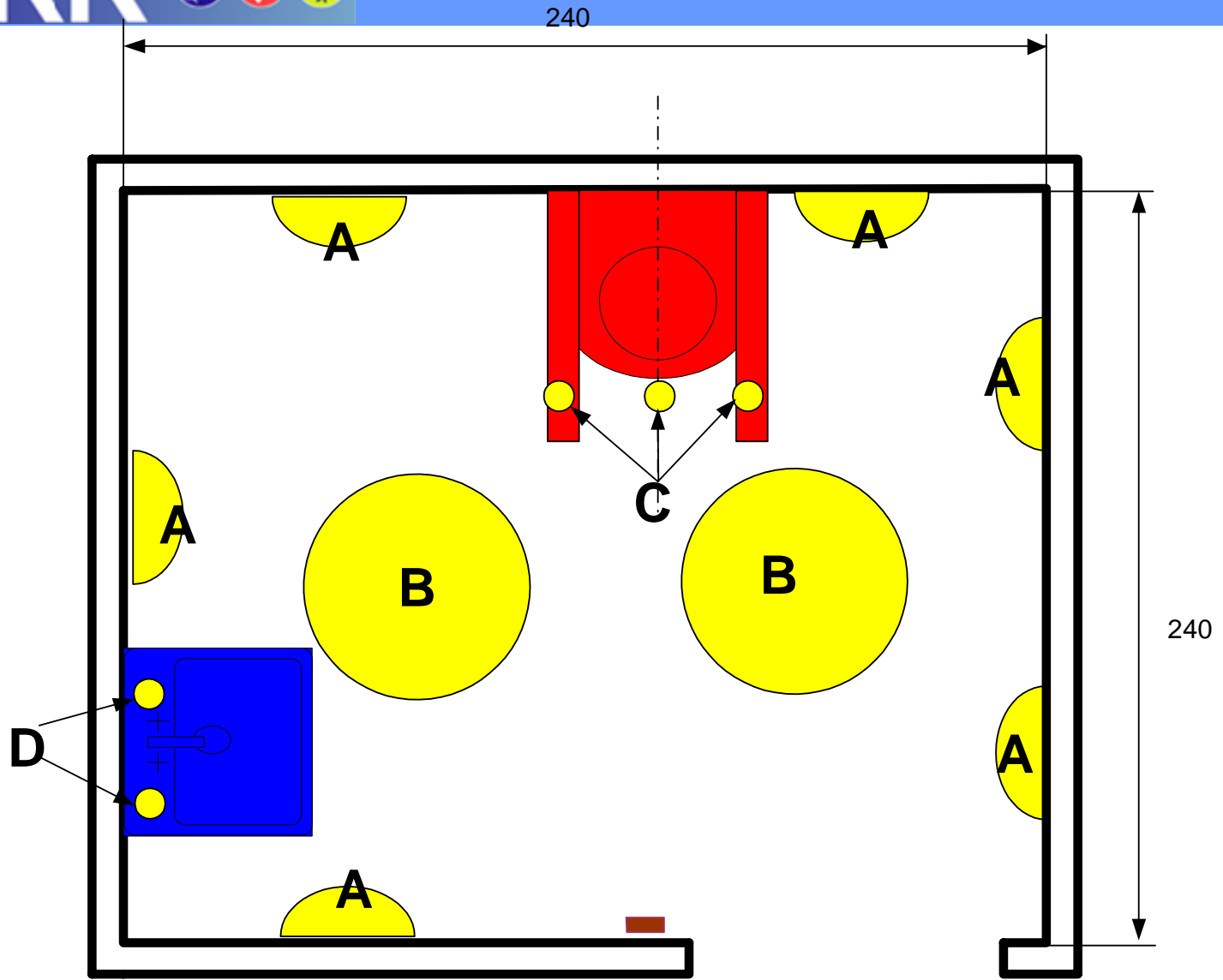
- Darker floor than walls
- Floor/wall and wall/ceiling “can” be delimited by a strip in a divergent lightness





Recommendations (4)

- Indirect light
- Frosted glass on the globe/lamp chimney
- Individual level of the illumination







Positions in the rest room where a high level of illuminance are recommended

- Entrance
- Toilet
- Sink

For both sitting and standing people

A last recommendation

At least 2 lamps

Why?

If one is not working!!!!

Advice: 2 different circuits!!!!

Thank you!!!!!!