

# DESIGNING FOR ADVANCED AGE AND DISABILITY: A SPECIFIER'S GUIDE TO CREATING ACCESSIBLE SPACES



## INTRODUCTION

The Australian population is rapidly ageing with the proportion of people aged 65 years and over increasing markedly in recent years.<sup>1</sup> The Australian Institute of Health and Welfare (AIHW) reported that in 2017, 3.8 million Australians – 15% of the population – were aged 65 years or over.<sup>2</sup> This figure is expected to grow in the coming years, with forecasts predicting that 25% of the population will be 65 years or over by 2097.<sup>3</sup>

The growing elderly population is placing new demands on infrastructure and healthcare facilities, which must now cater to the requirements associated with an ageing population. These needs include mobility and accessibility issues, as well as compliance with the relevant Australian Standards. Incorporating accessibility measures is especially critical in high-use environments, such as the

kitchen, washroom and other similar spaces which are used daily by all members of the population. Against this backdrop, architects, designers and specifiers must equip themselves with the relevant skills and knowledge to create universally accessible spaces.

In this whitepaper, we take a close look at the Australian standards and regulations that cover accessible design with respect to aged care facilities and other environments with elderly users and those requiring greater consideration for access and mobility. We also highlight the key design considerations that must be accounted for when designing for the elderly or less mobile with specific reference to tapware. Finally, we present a range of innovative solutions that specifically address the needs of these users.





“ When creating accessible spaces for the elderly or less mobile, designers and specifiers should consider a range of circumstances, physical limitations and health risks commonly associated with advanced age and disability. ”

## UNDERSTANDING THE REGULATORY REQUIREMENTS FOR ACCESSIBLE DESIGN

### **AS 1428 Design for Access and Mobility – Part 1 and 2**

Part of the AS 1428 series that specifies the design requirements for access and mobility, *AS 1428.1-2009 Design for access and mobility – General requirements for access – New building work* sets out the minimum design standards that must be met in new building work. The scope of this Standard includes:

- access and circulation for wheelchair users;
- access and facilities for users with ambulatory disabilities; and
- access for users with sensory disabilities.

This Standard is often interpreted as extending to elderly users, who are the most likely to have limited mobility. There is an established link between age and disability with the AIHW reporting that the average 65-year-old Australian will experience

“some level of disability” for over half of their remaining years.<sup>4</sup> Supporting this finding, AS 1428.1 notes that 36.4% of people aged 60-64 and 66.7% aged 75 or older have a disability.<sup>5</sup>

In *AS 1428.2-1992 Design for access and mobility – Enhanced and additional requirements – Buildings and facilities*, more extensive requirements are given for specific spaces, with Appendix A relating specifically to kitchens and laundries. Requirement A6 provides specific requirements for taps, namely that lever action fittings should be used for people with limited hand movement; and where possible, ball valve operation should be used for ease of use and maintenance. The Standard also sets the minimum clearance requirements for tapware components in kitchens.

## OTHER DESIGN CONSIDERATIONS

---

When creating accessible spaces for the elderly or less mobile, designers and specifiers should consider a range of circumstances, physical limitations and health risks commonly associated with advanced age and disability. This includes decreased strength, visual impairments, limited range of motion and reduced capacity. Designers and specifiers should also implement measures that promote safety and require minimal physical effort.<sup>6</sup> Some of the main design considerations for accessible spaces are discussed in more detail below.

### Health and Hygiene

Designers should consider how easily features such as tapware can be cleaned and maintained, especially for the elderly or less mobile who have reduced capacity for cleaning. It has been well established that elderly patients, especially those with disabilities, are at particularly high risk of developing infectious disease.<sup>7</sup> Elderly users will also typically have weaker immune systems, meaning they are more often prone to illness and gastrointestinal disease.<sup>8</sup> Accordingly, designing an environment that can be easily cleaned is critical to reducing the risk of bacterial spread and disease.

In general, access to water is among the most important considerations when designing spaces for these user groups. Efficient and easy-to-use tapware and water filtration systems are key to maintaining the health and wellbeing of elderly users as illness and disease can be spread through improper hand washing and may prove fatal in cases of dehydration.<sup>9</sup>

Designers and specifiers should consider tapware that feature touchless operation for commercial washrooms or spaces with multiple users, such as in aged care facilities. Leading suppliers now provide tapware that can be operated hands-free using an automated sensor. To ensure easy access to filtered drinking water for all users, water filtration systems that comply with disabled access standards should also be considered. Selected water filtration systems accommodate the elderly and less mobile with features like remote control and touch-sensitive dispensers.

### Ease of Operation

Ergonomic considerations are critical when designing for the elderly, who have significantly less grip strength than the average, able-bodied user. On the Harvard Medical School website, Harvard Health Publishing note that grip strength in men begins to deteriorate around age 55, possibly associated with age-related decline in muscle mass.<sup>10</sup> This is coupled with the fact that over 60% of Australians between 65 and 79 years old have arthritis and/or suffer from other musculoskeletal conditions<sup>11</sup> that affect their ability to grip and operate objects. Accordingly, designers should investigate options that do not require significant grip or twisting force.

Lever operation is usually ideal for users with limited mobility and grip strength due to it requiring significantly less operational force. Levers can also be initiated using the back of the hand, arm or other body part besides fingers. As mentioned above, some manufacturers and selected suppliers now provide dispensers that feature touch-sensitive operation, which require minimal pressure to operate.



## Vision Impairment and Visual Recall

Visual impairment and recall are common issues associated with advancing age. Medical research indicates that the normal function of eye tissue decreases with age.<sup>12</sup> At the same time, demographic studies indicate that age is the best predictor of blindness and visual impairment.<sup>13</sup> Dementia is another prevalent issue among the elderly with the AIHW reporting in 2016 that it affects one out of ten people aged 65 years and over in Australia.<sup>14</sup> Dementia sufferers can experience issues with sight loss, visual recall and hallucinations.<sup>15</sup>

In light of these factors, designers and specifiers must implement design features that accommodate users with vision, sensory and memory impairment. For example, leading manufacturers and suppliers offer tapware with tactile braille pads for vision-impaired applications. Tapware with red and blue levers provide increased visual contrast ensuring that vision-impaired users can identify and safely use hot and cold water dispensers. Red and blue are also commonly recalled associative colours for dementia residents.<sup>16</sup>

## Wheelchair Access

Designers must also consider the possibility that elderly users will be wheelchair-bound or have limited range of motion affecting their vertical and horizontal reach. Tapware operating controls should be placed at a height and location that enables safe, easy use – without straining – by both ambulant users and those in wheelchairs. Some tapware suppliers now provide control panels that can be mounted onto walls or other vertical planes for easy access.

## BILLI

---

For almost three decades, Billi has led the market with innovative tapware and instant boiling and chilled water filtration systems. Proudly Australian-made and designed, Billi products are celebrated for their combination of functionality, performance and contemporary aesthetics. Driven by a strong research and development team and a commitment to improving user health and quality of life, the company supplies a range of instant boiling and chilled water dispensers and washroom sensor taps that meet the needs of a broad range of users.

Billi products enable architects and specifiers to create accessible spaces that address the needs of the growing elderly population and those with reduced physical ability. All Billi products are fully compliant with the relevant Australian Standards and deliver extended ease of use, efficiency, and a sleek contemporary aesthetic regardless of their installation context. Incorporating cutting edge eco-technology features and modern designs, Billi delivers solutions that seek to innovate on behalf of designers, specifiers and users alike.

### Billi X-Series Water Dispensers

The Billi X-Series Water Dispensers is a range of innovative, contemporary dispenser options that combine with Billi Instant Boiling, Chilled and Sparkling Filtered Water Systems to deliver performance, modern aesthetics and enhanced accessibility to a wide range of users.

The XL Levered Dispenser features a streamlined, elegant profile that is easy-to-clean and maintain and is simply

operated with its position-sensitive levers. This DDA-compliant dispenser enables users with limited mobility and grip strength to use Billi water systems with ease. Available in a variety of finishing options – including Chrome, Matte Black, Matte White or Rose Gold – the XL Levered Dispenser can be specified to match virtually any desired aesthetic. Other special finishes include Platinum, Urban Brass and Gun Metal Grey.

XL Levered Dispensers are also available with contrasting red and blue levers that provide full vision safety where LED indicators cannot be seen. This assists users who are vision-impaired or who have issues with visual recall to safely operate the dispenser. Optional braille pads can be supplied with XL Levered Dispensers to provide further safety to vision-impaired users.

With its minimal profile and modern design, the XT Touch Dispenser is a lever-free, touch-sensitive tap with a top operating panel. Requiring minimal pressure to operate, this dispenser is suitable for a broad range of physical abilities and strength levels. Its clean, sophisticated style pairs well with contemporary aesthetics and its variety of finishes – specifically, Chrome, Brushed, Matte Black and Matte White – provide designers with significant creative freedom.

Another version of the lever-free tap, the XR Remote Dispenser has an operating panel that is located away from the tap. The operating panel can be installed at any desired position to meet design requirements, including at various heights to ensure access for wheelchair-bound users and users with a limited range of motion.

The XR Remote Dispenser is the filtered drinking water solution of choice for the Australian Federal Government and is currently rolling out across National Disability Insurance Scheme (NDIS) sites nationwide.

### Billi Sensor Taps

Enabling hands-free operation for greater levels of hygiene, Billi Sensor Taps from the Washroom range feature a unique electronic sensor built into the spout which automatically detects hand movement in the hand washing zone. As soon as your hands move away from the tap, it automatically shuts off reducing water wastage. Billi Sensor Taps are available in both wall and bench mounted options and come in Chrome, Brushed, Matte Black or Brushed Brass finishes.

### Warranty and Compliance

Manufactured under a certified ISO9001 quality control system, Billi products are WaterMark-certified and deliver high levels of quality and reliability to customers. In support of this, Billi drinking water systems come with a 24-month warranty. The Washroom range of products are covered by a 12-month warranty. Billi water systems are also designed to deliver the highest possible standards of efficiency and energy savings.

All Billi drinking water appliances systems have been independently tested and comply with the relevant standards. This includes *AS/NZS 4020-2018 Testing of products for use in contact with drinking water* and *AS 1428 Design for access and mobility*.

## REFERENCES

- <sup>1</sup> Commonwealth of Australia. "2071.0 - Census of Population and Housing: Reflecting Australia - Stories from the Census, 2016." Australian Bureau of Statistics. <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2071.0~2016~Main%20Features~Ageing%20Population~14> (accessed 11 September 2019).
- <sup>2</sup> Australian Institute of Health and Welfare. "Older Australia at a Glance." AIHW. <https://www.aihw.gov.au/reports/older-people/older-australia-at-a-glance/contents/demographics-of-older-australians/australia-s-changing-age-and-gender-profile> (accessed 11 September 2019).
- <sup>3</sup> Ibid.
- <sup>4</sup> Australian Institute of Health and Welfare. "Life expectancy and disability in Australia: expected years living with and without disability." AIHW. <https://www.aihw.gov.au/reports/disability/life-expectancy-and-disability-in-australia-expected-years-living-with-and-without-disability/contents/table-of-contents> (accessed 11 September 2019).
- <sup>5</sup> Standards Australia. "AS 1428.1-2009 Design for access and mobility Part 1: General requirements for access – New building." SAI Global. <https://www.saiglobal.com/PDFTemp/Previews/OSH/As/as1000/1400/N14281.PDF> (accessed 11 September 2019).
- <sup>6</sup> National Disability Authority. "What is Universal Design." Centre for Excellence in Universal Design. <http://universaldesign.ie/What-is-Universal-Design> (accessed 11 September 2019).
- <sup>7</sup> Jones, SR. "Infections in frail and vulnerable elderly patients." *American Journal of Medicine* Vol. 88, No. 3 (1990): S30–S33.
- <sup>8</sup> Australian Government. "Germs and disease." Department of Health. <http://www.health.gov.au/internet/publications/publishing.nsf/Content/ohp-enhealth-manual-atsi-cnt-l~ohp-enhealth-manual-atsi-cnt-l-ch1~ohp-enhealth-manual-atsi-cnt-l-ch1.4> (accessed 11 September 2019).
- <sup>9</sup> Ibid.
- <sup>10</sup> Harvard Health Publishing. "Give grip strength a hand." Harvard Medical School. <https://www.health.harvard.edu/healthy-aging/give-grip-strength-a-hand> (accessed 11 September 2019).
- <sup>11</sup> Australian Institute of Health and Welfare. "Arthritis and other musculoskeletal conditions across the life stages." AIHW. <https://www.aihw.gov.au/getmedia/9717d56f-581e-4223-948e-85abd46312be/15678.pdf.aspx?inline=true> (accessed 11 September 2019).
- <sup>12</sup> Loh, KY and J Ogle. "Age related visual impairment in the elderly." *Medical Journal of Malaysia* Vol. 59, No. 4 (2004): 562-568.
- <sup>13</sup> Ibid.
- <sup>14</sup> Australian Institute of Health and Welfare. "Australia's health 2016: Dementia." AIHW. <https://www.aihw.gov.au/getmedia/7cbc5e72-758a-4878-9347-beaa26de6608/ah16-3-12-dementia.pdf.aspx> (accessed 11 September 2019).
- <sup>15</sup> Bowen M, DF Edgar, B Hancock, et al. "The Prevalence of Visual Impairment in People with Dementia (the ProVIDe study): a cross-sectional study of people aged 60–89 years with dementia and qualitative exploration of individual, carer and professional perspectives." *Health Services and Delivery Research* Vol. 4, No. 21 (2016): [https://www.ncbi.nlm.nih.gov/books/NBK374272/pdf/Bookshelf\\_NBK374272.pdf](https://www.ncbi.nlm.nih.gov/books/NBK374272/pdf/Bookshelf_NBK374272.pdf) (accessed 11 September 2019).
- <sup>16</sup> Benson, Sue. "The Use of Colour in Dementia Specific Design." *Journal of Dementia Care* (July/August 2002): 20-23.