

VittrA

**INCLUSIVE
BATHROOM
DESIGN
AS WE AGE**

VitrA's "Design for All" Approach

Every year VitrA delivers thousands of products to customers all around the world. From WC pans to sinks, bathroom furniture to bathtubs and tiles, VitrA offers users and professionals every product they need.

VitrA believes that every user deserves the same level of comfort in the bathroom. We embrace Design for All principles in our design process to ensure that our bathrooms achieve this by adapting to people's evolving needs throughout their lives. Accessible, Safe, Functional, Respectful bathroom design is the core of our approach.

An ageing population is driving the demand for innovative solutions that support independence at home for people living with long-term conditions or disabilities. This guide aims to raise awareness about what makes bathrooms accessible and adaptable and to suggest inclusive and aesthetically pleasing solutions that address specific needs without stigmatizing anyone.

The following insights are the result of a collaboration between VitrA and **Lab4living** based in the **Art and Design Research Centre at Sheffield Hallam University**. Findings have been drawn from a number of research projects that consider the changing role and function of the bathroom as populations age and their needs and desires evolve. VitrA's goal is to create a better bathroom experience for everyone: now and in the future.

*Prepared by VitrA in collaboration with
Sheffield Hallam University Lab4Living.*

VitrA

Sheffield
Hallam
University



LAB 4 LIVING

Inclusive Bathroom Design As We Age

As We Age

Physical factors

1. Strength
2. Grip Strength
3. Vision
4. Hearing
5. Balance

Cognitive Changes

The Bathroom Space

Layout

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Lighting and colour

Walls

Sound

Storage

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Heating

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Introduction

Traditionally the bathroom has been seen as a utility space in the home, somewhere private for washing and toileting. This has evolved considerably over the latter half of the last century and today the bathroom is used for an ever in-creasing range of activities. In addition to the everyday functions of cleaning, dressing, dealing with medication, drying clothes and providing storage, the bathroom is now a place for relaxation, indulgence and pampering.

This report describes some Inclusive Design considerations for the changing role of the bathroom as we age.

Adopting an Inclusive Approach

The research that is the foundation of this report directly involved older people from local communities who helped identify the challenges of bathroom use that come about in later life.

The outcomes of the research aim to help and address these often complex issues with a view to highlighting the benefits of designing bathroom spaces more inclusively. It notates key cognitive, physical and technical considerations that can be taken into account before designing, remodelling or redecorating the bathroom. An aging society will be challenging to future healthcare services, presenting a strong case for designing inclusively to support the principle of 'aging-in-place'.

For example, getting in and out of the bath or shower requires strength, mobility and good balance, all of which can deteriorate over the course of our lives, what makes life easier for older people often works better for everyone else, including children.

As we age

For many people the house they live in as they enter older age at around 65 years will be where they want to stay for the rest of their lives. However, much can happen in the intervening years, which means it is essential that the bathroom is designed to be as adaptable as possible. Significant physical and cognitive changes are two principal aspects of aging.



Physical Factors

This report presents insights and practical considerations that might help create a bathroom environment that is easy, comfortable and safe for anyone to use. It aims to help define more inclusive, 'family-friendly' spaces that facilitate users' requirements as they age or as their health or mobility needs change. These understandings draw from an extensive programme of research (Future bathroom) undertaken within the Art & Design and Health & Social Care Research Centres at Sheffield Hallam Universities Lab4living.

1. Strength

As people age muscle mass will be lost leading to poorer control of both large and small movements. In the years following middle age approximately one third of muscle strength is lost.

Essentially, muscle weakening means a loss of strength and therefore also means more time will be needed to recover from tasks that demand physical exertion. Also coupled with a reduced brain to muscle signalling, products that require more complex dexterity, or that are physically demanding, can become difficult or even impossible to use.



Conforma

The Conforma Wall Hung WC is designed for seniors and physically challenged people who need specific seat heights. Conforma wall-hung WC pans can be easily installed in any bathroom at the required height without having to drill into the wall.



V-Care

V-Care makes daily personal hygiene easier and more comfortable. A user-friendly remote control activates the V-Care WC pan's washing and drying functions, reducing the need for assistance during the cleaning process.

2. Grip strength

Grip strength deterioration

When considering a bathroom installation or re-fit it is advisable that individual product controls such as handles are within easy reach at both standing and sitting levels and that they do not require excessive force to operate. Designing an environment that requires excessive reaching or high leg lifts may lead to a loss of balance, which could instigate accidents.

There are six generic factors that impact on people's ability to operate controls such as shower controls, taps and flushes.

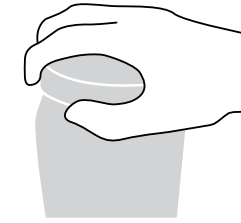
- Their age
- Their gender
- Their grip strength
- The coefficient of friction between the hand and the device.
- Their wrist strength
- The diameter of the device / control

Males are stronger than females and the average 70 year old has similar strength to a 10 year old child (Department of Trade and Industry 1999). Strength tends to decrease with age rising to a peak between the ages of 25 and 50 years and declines thereafter.

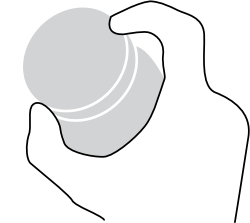
Types of grip



Lateral grip



Spherical grip



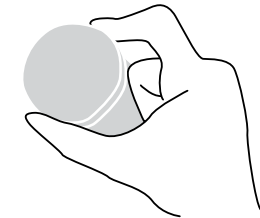
Tip grip



Cylindrical grip



Pulp grip



Box grip



Pronated Cylindrical grip

People use a wide variety of grips when performing everyday activities. While a transverse volar grip is used while handling larger objects, pinch grip is more of a precision grip. There is a strong correlation between grip force and the ability to perform everyday activities. Age related conditions such as rheumatism and increasing neurological deficit result in reduced grip force compared to healthy individuals. (Scandinavian Journal of Occupational Therapy).



Pure



Aquasee



T4

Easy-to-control basin mixers

The photocell system of the Aquasee series provides hands-free comfort, while the lever and joystick handles of the Pure and T4 series remove the need for grip control.

Cleaning activities are an important part of bathroom maintenance. Bending and awkward posture can place excessive strain on the body. Research (Kamat et al, Journal of Ergonomics 2009) shows that cleaning activities are seen to produce high pain levels in the hand and relate to a number of types of grip techniques and forces. Hand size is one reason why woman feel different pain and discomfort to men as a consequence of higher pressures when gripping.



Rim-ex
VitrA Rim-ex offers maximum hygiene and easy cleaning without the need for complex hand positions, thanks to its rimless WC bowl.

The bathroom is a space where hands are often wet and soapy so the co-efficient of friction between the hand and the control (e.g. tap) is low. The shape and texture of the control (e.g.) can help increase the comfort and friction (reduce slip) of the grip.



Solid S Bath / Shower Mixer



Solid S Basin Mixer

Solid S

The Solid S series presents a variety of faucets, including easy-to-control and medical handle options.

3. Vision

Eyesight naturally worsens as we age. Blurred vision is very common in the over 40s (aoa.org) and can affect many people's ability to perform daily tasks regardless of any other, underlying eyesight astigmatism such as short-sightedness. As we age cataracts become more common (opaqueness to the lens of the eye) resulting in further visual deterioration. At age 60 we need three times the amount of light to see as well as a 20 year old and at 70 years we need four times as much light. This can be attributed, in part, to a reduction in pupil size and its speed of reaction to the amount of ambient light entering the eye. Therefore the design and installation of products, controls and instructions (for example: temperature readings on water outlets) need to be as clear as possible, in terms graphical layout and illumination. Visual acuity, the ability of the eye to see fine detail in graphics and symbols, can be enhanced through careful consideration of contrast, colour, and scale. Symbols should be designed such that they are easy to understand and the user is able to see them clearly. Light text on a dark background has been found to be preferable than darker text on a light background for example. (ISO 17480). As we age we can also experience a decline in our peripheral vision, as well as decreasing interpretation of colour (specifically the colour blue) and contrast.



Nest Trendy

Nest Trendy washbasin cabinets and mirrors have a lighting feature that makes it easier for users to find their way, even in the dark.

4. Hearing

It is likely we will all experience some degree of hearing impairment as we grow older. This not only affects our communication with others but can influence our ability to respond to the environment: the sound of warning alarms, running water, or the sounds that may indicate whether a device is working or not. Conditions such as tinnitus can affect hearing, or result in increased sensitivity to everyday sounds.

Reducing excessive noise or incorporating sound dampening acoustics can help to compensate for auditory sensitivity. Further mitigation can be achieved by installing visual alarm indicators.

5. Balance

The same part of the ear that controls hearing, the inner ear, has a role in the maintenance of balance and as a result any loss of hearing may also impact on our balance. Hearing loss occurs when the inner ear is damaged or malfunctions due to disease, injury or deterioration in older age and these changes can impact on the mechanisms that register movement and which in turn impact on balance. Compromised balance can lead to an increased possibility of falls and injury, further exacerbated by often slippery and hard surfaces found in the bathroom.

V-flow

V-Flow shower channels are easy to use and clean because they are installed at floor level. The use of tiles in the shower area facilitates both visual integrity and easy access.



VitrA Shower Area Solutions: Ocean

VitrA has a wide range of zero surface or lower height acrylic and ceramic shower trays with anti-slip surface options.





Cognitive changes

Cognition is a group of processes such as memory recall and attention that enables decision-making, problem solving and the use of language. Understanding age-associated changes in cognition is complex and challenging although most research indicates that from age 60 years onwards a majority of individuals will start to experience some decline in cognitive skills, particularly those associated with memory. Listed below are typical aspects of cognition and the potential effects of cognitive impairment:

Cognitive Aspect	Potential Effect of Cognitive Impairment
Memory	Reduced ability to remember
Carrying out complex tasks	More difficult to complete
Time needed to acquire and process information	Time to process information is increased
Recognition and comprehension of new information	Comprehension is impaired
Reactions	Reaction speed is reduced
Language and literacy	More difficult to explain things
Intellect	Slower information processing

As we age there are major reductions in inductive reasoning, spatial orientation, perceptual speed and verbal memory with a more modest decline in numeric and verbal ability. Memory should not be understood as one entity - the table below lists the different memory systems:

Memory System	Specification
Episodic Memory	Memory of specific events, such as a wedding day or other significant lifetime events
Working memory (Short-term Memory)	Information held and manipulated in conscious awareness
Semantic Memory (Long-term memory)	General knowledge and for highly practiced habits and procedures
Sensory memory	Retention of sensory information after stimulus is removed.

Episodic memory and working memory may decline rapidly in older adults whilst memory for perceptual information and general knowledge hold up well. So for example an older person may go to the bathroom cabinet but then forget why, i.e. did they go in to clean their teeth or to take their medication? They know what the bathroom cabinet is for but forget why they wanted to use it.

These differences in memory affect an older person's relationship with product use in several ways. The use of semantic memory and general knowledge enables older people to build up a set of skills through the life course. Studies have shown that many older people have developed 'coping strategies' to overcome challenging tasks; for example, a wooden board across a bath to sit on. However, people cope with a compromised solution that can often be dangerous.



Layout

Most people will undertake modernisation and / or remodelling of their bathroom only twice in a lifetime. The layout of the bathroom is very important and fixtures are difficult to change or move once installed. Consequently, it is important to consider what may be needed in the future, before making final decisions. For instance, thinking about the position of the bathroom furniture and fittings, cupboards and other accessories and personal items, so that they will always be easy to reach and use.

This section details considerations when dealing with flooring, lighting, colour, acoustics, heating, storage and walls (vertical surfaces)

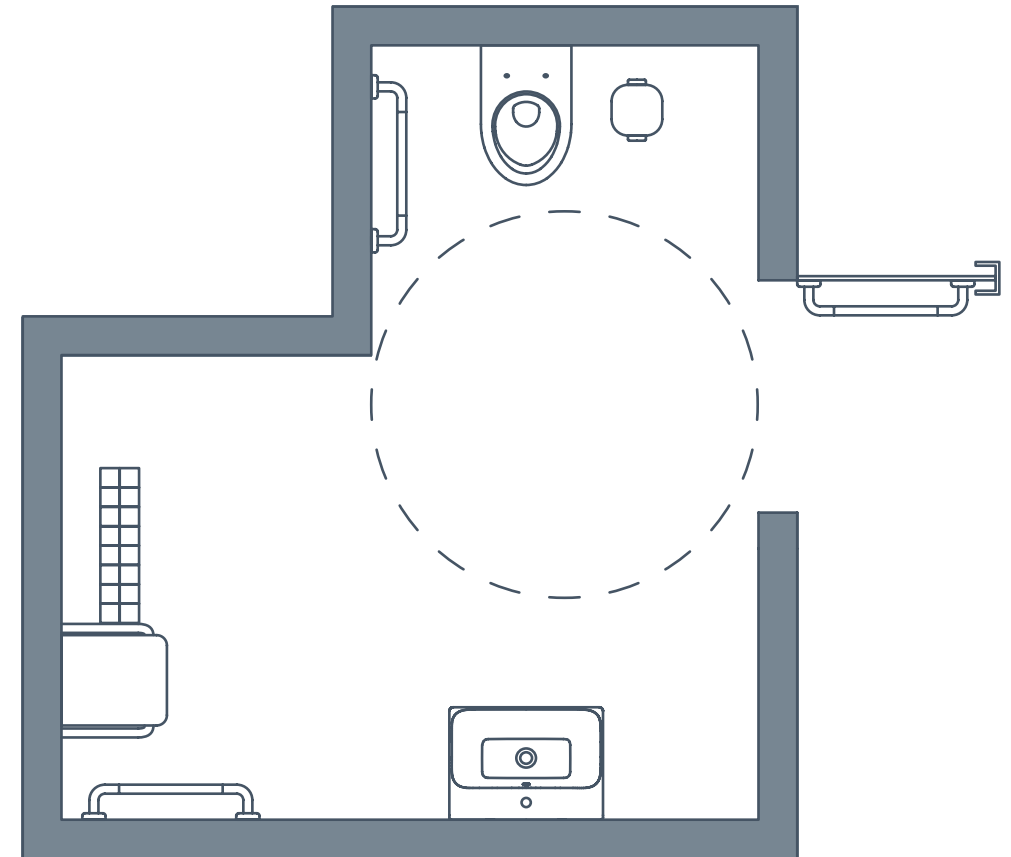
The shape, size and number of rooms dedicated to personal cleaning, toileting or relaxation in a house or apartment will be dictated by many factors including the socio-economic situation of the users, the type of property, its construction and learned behaviours whether cultural or from paternal or maternal learning. Users therefore may use multiple rooms for washing, grooming, dressing, undressing and toileting or this may be undertaken in one single dedicated space.

When designing the bathroom space, it is important to consider the physical placement of the major items within the room i.e. the toilet, sink, shower, bath and appropriate storage. Consideration must be given to the ease of use and access of each item but also in relation to the way the items relate to one another.

For example, a stand-alone shower cubicle with its door in an open / accessible position, and how this position may create interference with other items, other doors or even other people.

In a caring situation there may be more than one person in the space at any one time, so it is important to maximise the space around fixtures and fittings to allow someone providing assistance to stand or sit securely.

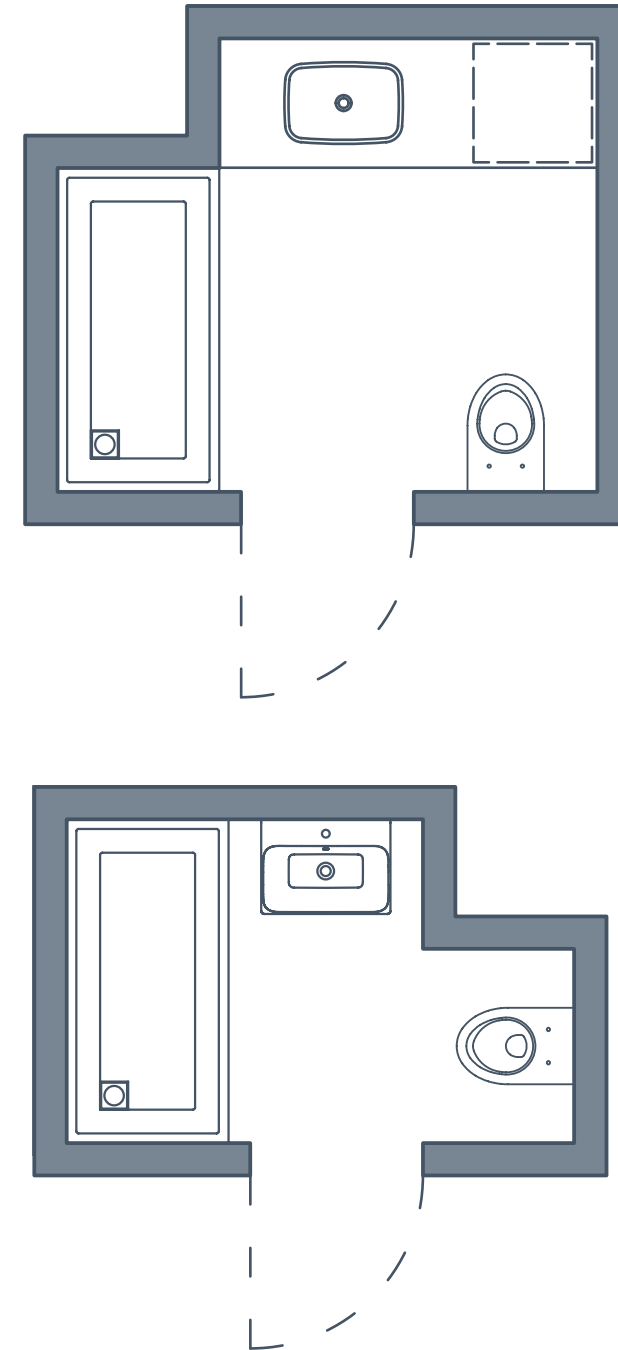
The same is true for doors in and out of the room, as well as windows and the doors and / or drawers of storage units.



The Bathroom Space Layout

It is advisable to avoid placing items that are regularly used at the same time on the same wall, or next to each other.

For example, a toilet and sink can be said to be 'paired' items because people will often wash themselves after going to the toilet. Placing them in-line with each other may encourage sharp body movements when transferring from one to the other. Fast, tight body movements, turning on the spot for instance, can lead to injury as a result of loss of balance or muscular or skeletal injuries. If possible place such paired items opposite one another, or at least at 90 degrees to one another, so that sharp body movements are reduced or eliminated.



Flooring

Flooring should be level and non-slip - this will eliminate the need for non-slip mats which can be a trip hazard. Floor surfaces should ideally be plain, non-reflective and evenly coloured. The colour should contrast with the colour of the walls and other fitments. If different floor finishes are used in the same space ensure where different floor finishes meet, that they are flush. (Local Government Association, 2012)

Where level changes are unavoidable they should be clearly marked and well lit, with a handrail available for those who may have difficulty negotiating the different levels (Burton, Mitchell and Ramen, 2004)



Pietra Pienza

VitrA tiles provide both functionality and aesthetics. The Pietra Pienza porcelain series, with its stone texture and R9 surface, offers easy-to-clean and anti-slip floors with countless color options.

Lighting and colour

As vision deteriorates with age, good lighting becomes increasingly important. Although there may be an outside window to provide natural light in the bathroom, this will generally have to be screened for privacy and supplemented with artificial light at night. Also in many newer houses and apartments the bathroom has no external windows and will rely entirely on artificial light.

People who wear glasses will often be unable to benefit from them with many of the activities they undertake in the bathroom where it may be steamy or they will have been removed while using the shower, bath or washbasin. A well illuminated room will maximise the range of visibility for the individual.

Consider whether there is a need to control or focus the light, or to create a bright functional light as well as a softer, relaxing, ambient light for example Superbright LEDs, provide a dimmable lighting option suitable for a variety of scenarios. The overall lighting should be even, without pools of brightness or areas of shadow. This is applicable whether the light source is natural (e.g. from windows or doors) or artificial (e.g. ceiling lights). The use of natural light should be maximised wherever possible (The King's Fund, 2013)

It is advised that when possible, light switches should contrast with the wall / background they are placed on (The King's Fund (2013). Alternatively motion sensors, a form of assistive technology, can be installed to automatically turn lights on and off when a space is entered or vacated. This is useful at night, when light may be needed but leaving one permanently switched on might disturb sleep (Local Government Association, 2012).



Deluxe mirrors
Deluxe mirrors promise a better make-up and personal care experience with a mini magnifying mirror and illumination feature. There is also an anti-fog version, which is a fabulous convenience for personal care after a shower.

Walls

Walls can be simply considered as dividers between rooms to offer privacy. However, walls are important, not only as mounting points for a range of items but their construction and finish can dramatically affect the quality and functionality of the bathroom space. Surface finishes should be given consideration, with a range of hard and soft wall coverings currently available. They may present differing cleaning and maintenance characteristics and some products may offer a reduced tendency to develop condensation, or affect the quality of the acoustics within the bathroom.

Walls are often used for mounting lighting controls, storage and shelving units, mirrors and grab rails. When specifying and locating storage consider the user and work within their normal reach ranges. Often, wall mounted cupboards are placed too high to access upper areas without overreaching or using other aids to gain access (e.g. chair or steps). Mirrors assist people to carry out personal care and grooming and can have a positive impact on light and space. However, they may cause confusion (distorting space) and upset people with dementia who no longer recognise their own reflection therefore in such cases it may be necessary to provide a facility to cover or hide them away (The Dementia Services Development Centre (DSDC), 2012)



Nest Trendy

The Nest Trendy 80 cm washbasin has a great support option: the grab bar. Though mounted to the wall, it does not look like a supporter element because its design follows the outline of the washbasin.

Handrails can be incorporated into the design of the bathroom – they can often be ugly and stigmatise however they do not have to be obvious! For example some riser-bars for the showerhead and towel rails are now designed as dual-purpose support rails but they need to be fixed securely to the wall.

Sound

The range of sounds that can be generated within a bathroom from extraction fans to power showers can be slightly overwhelming and not conducive to a relaxing environment. This noise can be mitigated by the use of sound absorbent surface should be used (on floors and ceilings) to reduce echo and noise. (The King's Fund, 2013)

Extractor fans can be noisy and distracting, although commonly wired as part of the lighting infrastructure they should ideally be wired separately from any lighting to allow them to be operated in isolation. The use of radios and music/entertainment systems is becoming increasingly popular to enhance the environmental and sensory experience for the users.



VitrA Pro Concealed Cisterns

Thanks to the special filling group used inside, VitrA concealed cisterns work quietly.

Storage

The positioning of storage has been partly discussed in the 'walls' section but to note adequate storage will help to avoid clutter that can create confusion especially for people with Dementia. Unnecessary items should be removed to avoid distraction, confusion and possible hazards (The King's Fund, 2013).

However, it is also a good idea to display regularly used items such as toothbrush, toothpaste and shampoo, on open shelving (or similar) to aid memory. This will help to keep the space legible and easy to understand and navigate (Social Care Institute for Excellence, 2015).



Nest Trendy

The Nest Trendy adjustable mirror has a wooden back panel with shelves. Users can adjust the angle as they wish and display their favorite personal care items on the shelves.

Fixtures

Careful consideration should be given to the choice of the bath, shower, sink, toilet and taps to ensure a safe environment that is sustainable in supporting independence.

As previously discussed, it is more difficult to identify contrast as we age, especially at night, so it is a good idea to use colour and different materials to differentiate edges and corners of the fixtures in a bathroom.

Contrasting colours for toilet seat, flush handle / point and any grab rails. Dark colours work well but red should be avoided using as older people (especially those with dementia) often associate this colour with heat and danger and may avoid as a result.

It is important to maximise efficient, safe and easy movement between the fixtures through careful consideration of their orientation. For instance, a towel rail located next to, but behind a shower door, means a user is likely to perform complex movements to reach a towel on exiting the shower; over time this can put excessive and unnatural pressure on ageing bones.

The position of bathroom fixtures in relation to each other is important. For instance, if the toilet is next to the bath it can be useful as a seat when getting in or out of a bath, but consider that for some people this close proximity may act as a barrier to access. The needs and abilities of the user, available space and budget will all impact the eventual choice.

Space between bathroom fixtures is important for easy cleaning and maintenance, but there may also come a time when help is needed and then it will be important to have enough room for another person (a relative or professional carer) to stand beside, or between the fixtures.



Kimera
Kimera Compact Shower Unit provides not only an all-in-one shower unit solution but also a drying area with water-resistant floor made of natural iroko tree.

Heating

As people age they find their body temperature harder to regulate especially in their hands and feet. This can as a consequence of age related medical conditions such as diabetes, slowing metabolism, hypertension or thyroid problems or medication that can reduce blood circulation. Older people are more sensitive to the effects of temperature extremes. Consequently the control of temperature in the bathroom is important to maximise comfort and reduce risk and injury.

There are many heating products that can be plumbed into central heating systems or operate from a separate electrical supply. A heat source does not only provide controllable ambient bathroom temperature but also potentially useful for drying rails for towels and clothes. Radiators can take a lot of wall space, so think about space-saving types that come in a variety of different shapes and those that are easy to turn on and off and adjust.

AquaHeat

Thermostatic mixers save water by eliminating the need to adjust hot and cold water until the desired temperature is achieved, ensuring reliably constant outlet temperatures to prevent scalding injury. The inner body design creates an isolation layer between hot water and body, so the body surface is never too hot to be touched.



Nest Series

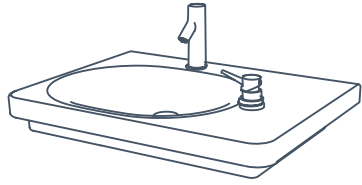
Nest products are designed to give users of all ages and capabilities the same comfort in the bathroom without sacrificing style. Nest's range includes bathroom products meeting international standards for public areas, long-lasting home-use products to be enjoyed for many years, and family products that make everyone happy.

Some of the features of the Nest portfolio are:

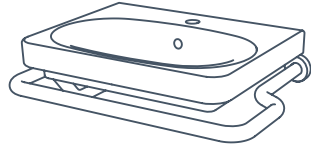
- Washbasins with multifunctional grab bar,
- Washbasins with suitable dimensions for access in a wheelchair or in a seated position,
- Easy-to-use faucet handles,
- Mirrors with adjustable angles and wooden shelves,
- Mobile storage units with lockable wheels and acrylic top surfaces to be used in wet areas.



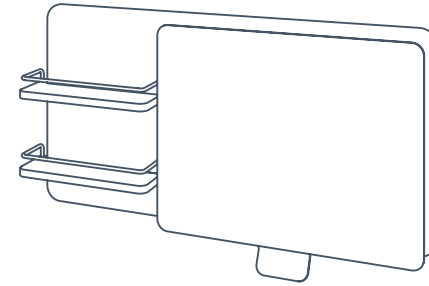




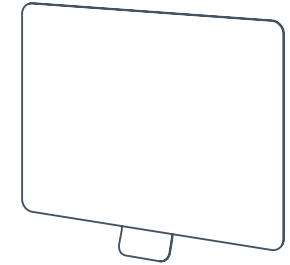
5966B003-7200 + 5966B003-7200 (INT)
Nest Asymmetrical washbasin, 80 cm,
with two tap hole, with overflow hole,
A47156EXP thermostatic faucet set is
included



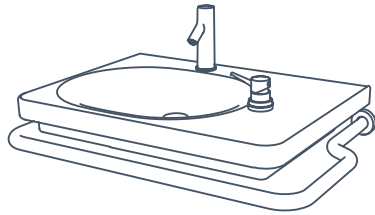
340-4020
Multifunctional grab bar, 60 cm



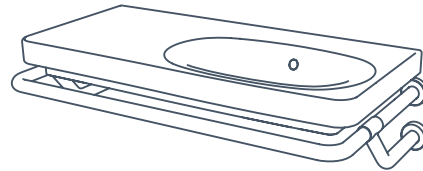
61012
Nest Trendy Adjustable mirror
with Shelf, Right, 100 cm



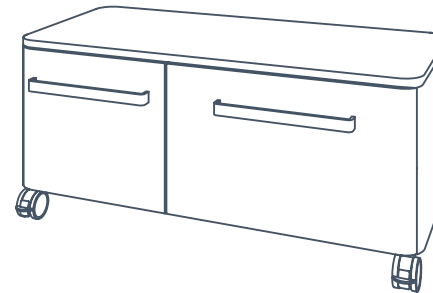
61010
Nest Trendy Adjustable Mirror, 60 cm



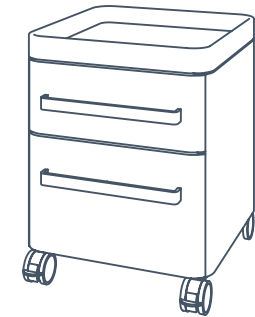
340-4021
Multifunctional grab bar, 80 cm



340-4022
Multifunctional grab bar, 100 cm



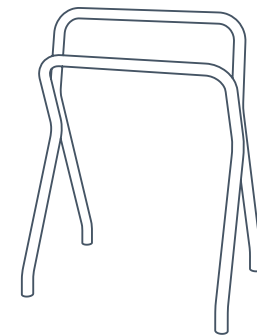
61009
Nest Trendy Low mobile unit
with 2 drawers, 100 cm



61013
Nest Trendy Mid Unit
with 2 drawers, 45 cm



A42455EXP
Nest Trendy Basin Mixer



320-4026
Freestanding grab bar

VitrA

Credits

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Nisan Tuncak

Industrial Designer, VitrA

Ayşegül Çakırusta

Senior Graphic Designer, VitrA

**Sheffield
Hallam
University**  **LAB 4 LIVING**

VitrA