



An Wholistic Approach to the Prevention of Biofilm Formation and Disturbance in Clinical Basins

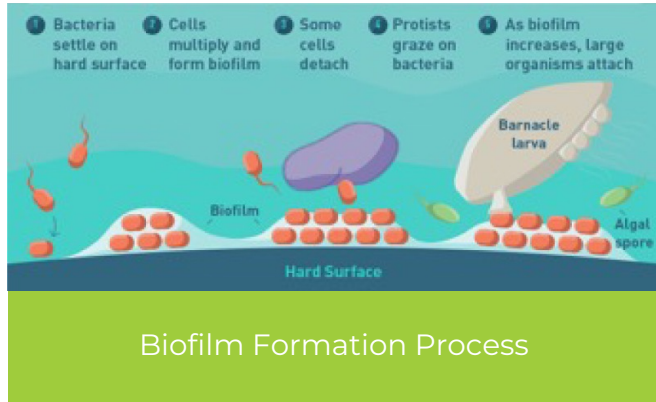
Presenter:

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CEO — GENTEC AUSTRALIA

Chairman — Australian Plumbing Manufacturers Association (APMA)

Begin with the Problems Associated in Biofilm in Clinical Basins — **Current Clinical Wash Station Issues**



- Biofilm can be made up of many different species of bacteria and may even include algae and fungi.
- Biofilm starts with planktonic bacteria cells attaching to a surface, and from there, the cells grow and multiply making the bacteria more powerful and effective



Microscopic View

- Biofilms growing in a basin waste, will generate multiple and continuous health risks.
- Biofilms left unchecked, together with poorly designed handwash stations, may contribute to contamination risks and increase opportunities for pathogen transmission.

Examples of biofilm growth:



From Water Delivery to Waste in Clinical Wash Basins— Current Clinical Wash Station Issues



WATER DELIVERY

- Legionella impacts



FORMATION

- Biofilm develops and persists



DISTURBANCE

- Water flow
 - Splash
- Routine basin use



DISPERSAL

- Droplets
 - Splash
- Potential aerosol pathways



EXPOSURE

- Potential pathway for environmental contamination



Can design reduce opportunities for disturbance and dispersal?

Disturbance may create opportunities for splash, droplet or aerosol generation, depending on the mechanism and conditions.

Typical Handwash Basin Used in Healthcare Environment—**Not Recommended**

Clinical handwash basins are designed to support infection prevention.

But the basin environment can also become:



A persistent source of contamination



A point of disturbance



A potential pathway for environmental contamination



Typical Handwash Basin Used in Healthcare Environment—**Not Recommended**

Observed Risk Factors at Central-Waste Basins



Direct alignment between tap flow and waste



Disturbance of biofilm within waste and trap



Splash and aerosol generation during use —
Splash can travel **up to 1 metre** into patient areas



Contaminant spread beyond basin zone



Embedded biofilm difficult to remove
through routine cleaning

Video



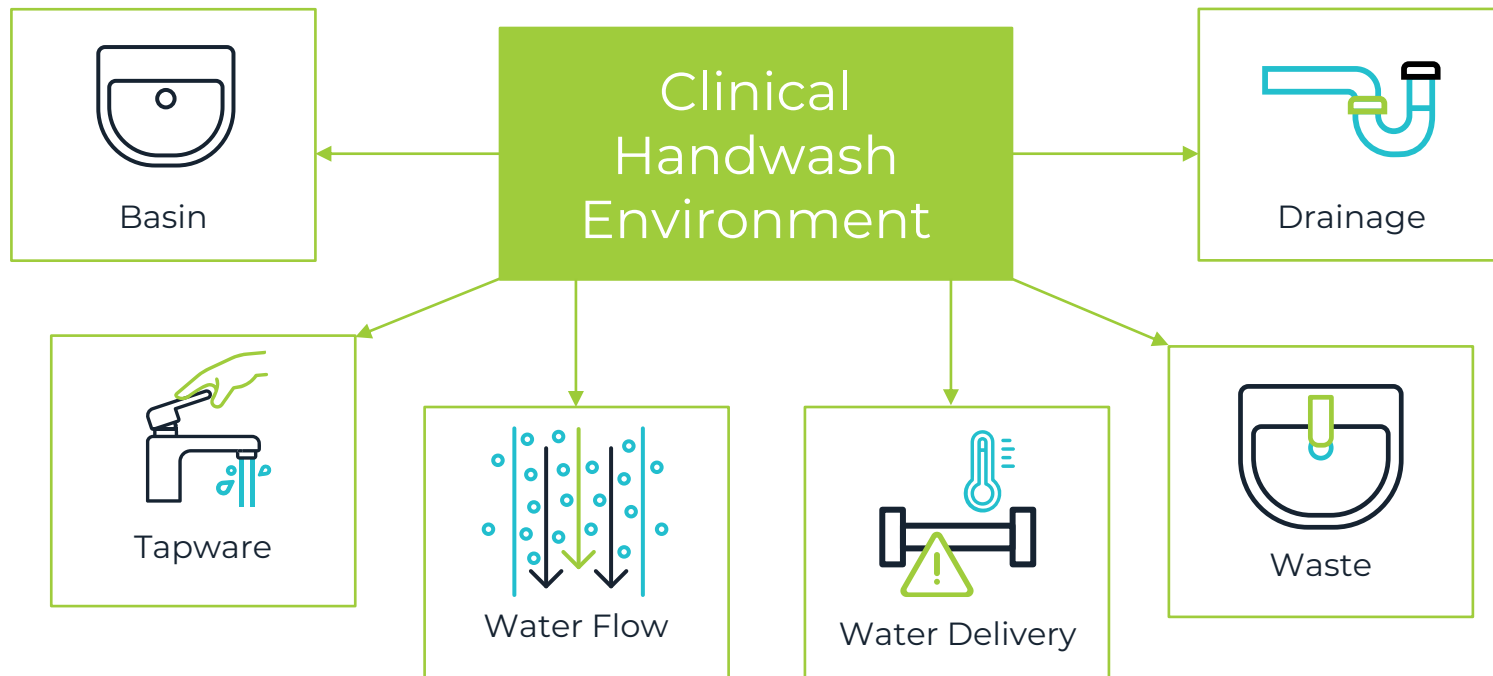
Research— When Sink Design Becomes Part of the Transmission Pathway

Canadian Hospital — Splashing out of drains outbreak

- Researchers found that an outbreak in a Canadian hospital in Toronto, spanned from 2004 to 2006 (2 years) was caused by multidrug resistant *Pseudomonas aeruginosa* breeding in and splashing out of the drains of hand-wash sinks in patient areas.
- Thirty-six patients were infected in the outbreak, 12 of whom died of their sinkspawned infection. Investigators found that with the water running, the sinks could launch deadly germs at least a meter away.

SOURCE : Hota, S., Hirji, Z., Stockton, K., Lemieux, C., Dedier, H., Wolfaardt, G., & Gardam, M. (2009). Outbreak of Multidrug-Resistant *Pseudomonas aeruginosa* Colonization and Infection Secondary to Imperfect Intensive Care Unit Room Design. *Infection Control & Hospital Epidemiology*, 30(1), 25-33. doi:10.1086/592700 <https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/outbreak-of-multidrugresistant-pseudomonas-aeruginosa-colonization-and-infection-secondary-to-imperfect-intensive-care-unit-room-design/6BAD255EE0A6DE0727C54FF4E39C0786>

Clinical Basin — Challenges



A Wholistic Approach for Clinical Wash Stations

Design Strategies to Reduce Contamination Risk

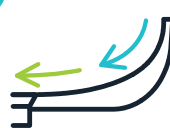
1



Waste Position

- Rear offset waste

2



Basin Geometry

- Sloped surfaces

3



Lead Free & Sensor Tapware

- Touch-free operation to reduce touchpoints

4



Water Flow

- Laminar Flow

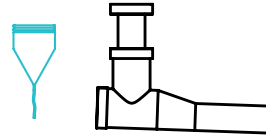
5



Water Delivery

- Thermostatic Valves & Taps
- Electronic Taps with Hygiene Flush

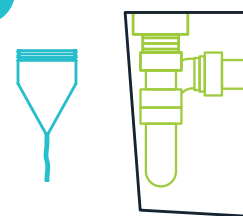
6



Drainage Interface

- One-Way Valve
- SteriTrap

7



Maintenance Access

- One-Way Valve
- Removable Shroud

Laminar Flow— AusHFG Part D: Infection Prevention and Control (Revision 8):
<https://healthfacilityguidelines.com.au/part/part-d-infection-prevention-and-control-2>

1 & 2

Basin Geometry and Waste Positioning: Designing the Water–Drainage Relationship

Video



Basin & Tapware installed at Maitland Hospital

- ✓ Control water movement
- ✓ Move waste away from primary impact zone
- ✓ Consider the drainage interface

Design intent: influence how water interacts with the basin and drainage system.

1 & 2 Applying Basin Design Principles

STERISAN® Clinical Basin Range —
Configurations Aligned with Australasian Health Facility Guidelines (AusHFG)
Part D: Infection Prevention and Control (Revision 8)



STERISAN® Basin installed
at Paula Fox Melanoma &
Cancer Centre



Type A Clinical Basin



Type B Clinical Basin



Type C Clinical Basin

AusHFG Part D: Infection Prevention and Control (Revision 8):
<https://healthfacilityguidelines.com.au/part/part-d-infection-prevention-and-control-2>

3

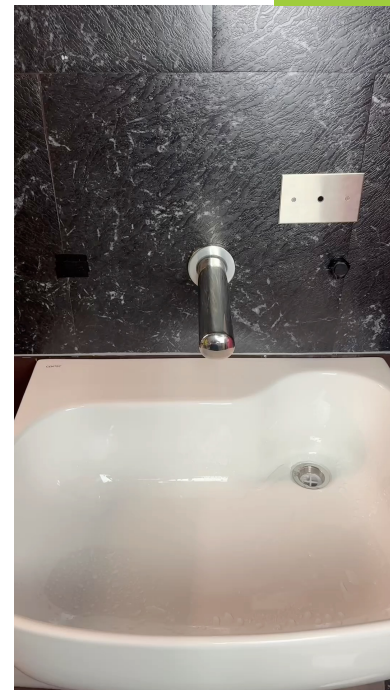
New Legislation for Lead Free

Using 100% Lead Free Tapware and Laser Sensor Touch-Free Tapware

- DZR Brass tapware contains Lead — harmful for vulnerable people such as aged, unwell and children.
- Stainless Steel tapware is 100 % Lead-free.
- Touch-free operation eliminates further transfer of bacteria to hands
- Reliable Laser sensor activation— eliminates nuisance triggering and recognises all skin tones unlike traditional infrared sensor taps
- In-built Hygiene Flush ensures warm water lines do not stagnant to assist with Legionella risks and freshens up the basin traps

Hands-free tapware is identified in the AusHFG Part D (Revision 8) guidance referenced in this presentation and is an important consideration in clinical handwash environments.

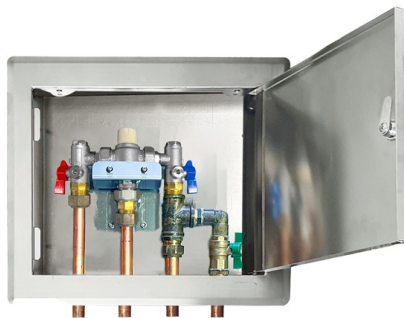
Video



5 Risk Prevention Strategy: Warm Water Delivery

Thermostatic Mixing Valves (TMVs) and Point-of-Use Thermostatic Taps

- TMVs and Point-of-use Thermostatic taps eliminate warm water runs, reduce Legionella growth.
- Hygiene Flush capability to eliminate Legionella in plumbing systems.



Why Flow Rate Matters

Traditional / In the Past

Higher flow tapware—
10L / min for adequate flush

Today

Water-efficient tapware—
6L / min

Green Star

4L / min

NABERS

2L / min



As we enter into lower flow rates,
We need to make design changes to the drain waste
to flush and refresh stagnant water

Examples of Various Flow Rates

At least **6.6 LPM** for

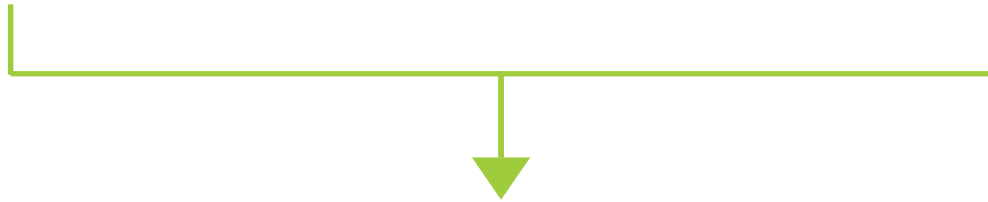
10–15 seconds

flushes P-Trap effectively.

6 LPM for at least

20 seconds

supports proper hand hygiene.



Reduce the build-up of biofilm and bacteria within the plumbing lines.



Reduce the risks of stagnant water within the trap or water seal.

6

Risk Prevention Strategy: SteriTrap



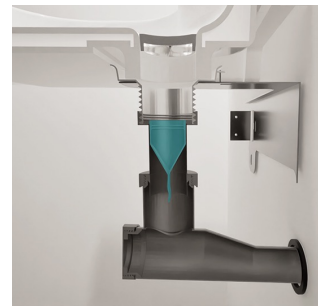
Plastic Bottle or Plastic P-Trap



PVC plastic trap can harbour bacteria and encourage biofilm growth



Bottle trap — Not recommended by AusHFG



SteriTrap



Dry Waste



One-way valve prevents bacteria coming back up to the basin



Doesn't require water to be in the waste



Durable and resistant to corrosion

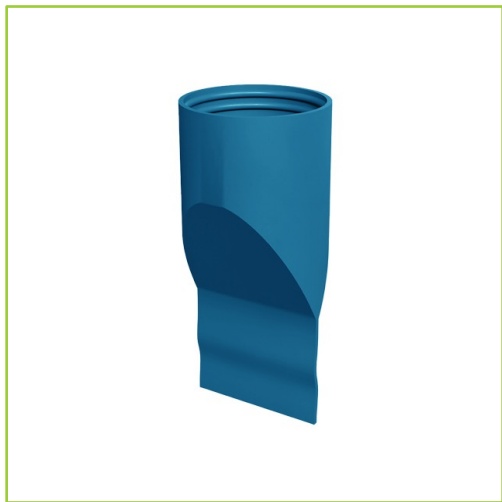
6 & 7 Managing Biofilm in the Waste

Video

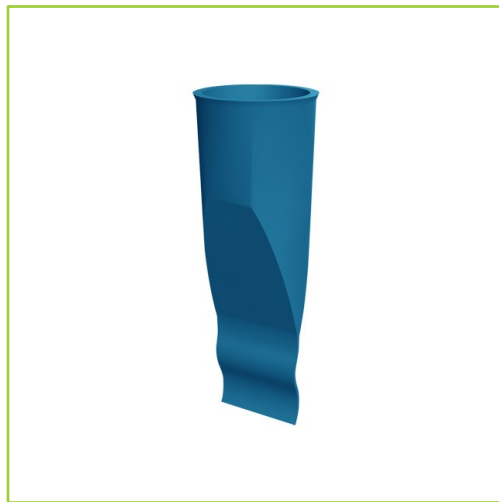


6 & 7

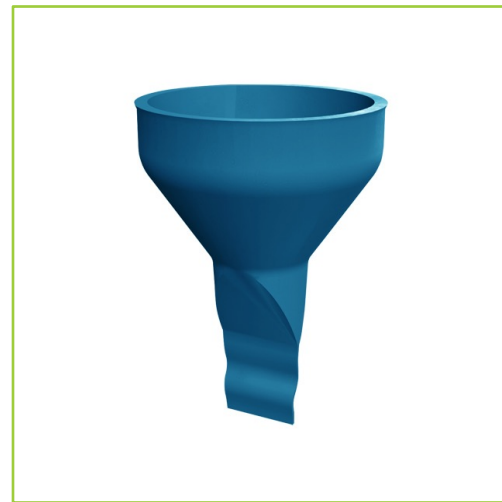
The New & Upgraded SteriValve — Coming Soon



40mm SteriValve



50mm SteriValve



100mm SteriValve

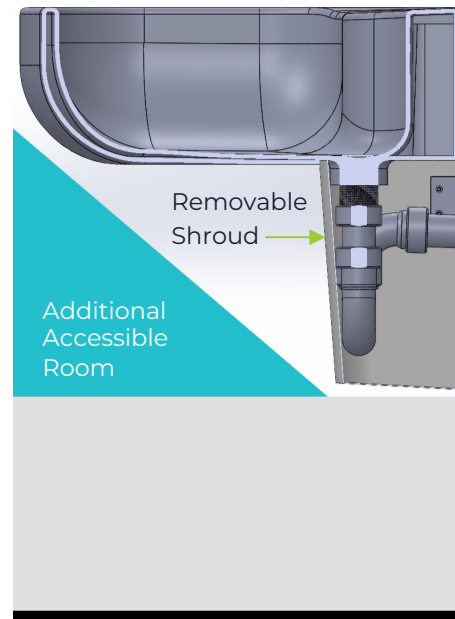
7

Designed for Easy Maintenance — Detachable Shroud

Access Is Part of IPC.

A design must be maintainable throughout its service life.

- Manufactured in Stainless Steel and Powder Coated white to match the Basin
- Lightweight construction
- No Gap as this has been designed to recess into the underside of the Basin
- Easy to remove for servicing



Detachable Shroud— AusHFG Part D: Infection Prevention and Control (Revision 8):
<https://healthfacilityguidelines.com.au/part/part-d-infection-prevention-and-control-2>

Case Study – Paula Fox Melanoma and Cancer Centre

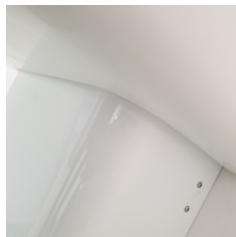


Design from the outset

- Basin selection
- Tap and spout configuration
- Waste positioning
- Drainage considerations
- Maintenance access

Case Study – Paula Fox Melanoma and Cancer Centre

Level 2 Treatment Hub

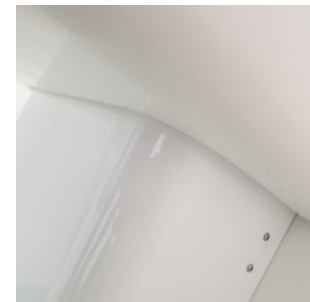


Products Installed:

- STERISAN® Basin with Rear Offset Waste
- Detachable Shroud
- Laser Sensor Touch-Free Electronic Tapware

Case Study – Paula Fox Melanoma and Cancer Centre

Level 4 Laboratory



Products Installed:

- STERISAN® Basin with Rear Offset Waste
- Detachable Shroud
- Swivel Spout
- Electronic Sensor Kit

Case Study – Joan Kirner — Western Health



Retrofit— Upgrade of Existing Tapware and Basins

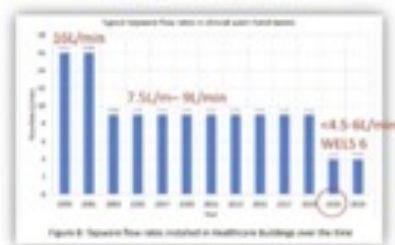
- ✓ Laminar Flow Outlets Fitted to All Tapware
- ✓ Stainless Steel Basin Waste with One-Way Valve Fitted to All Basins
- ✓ Replacement of Plastic Bottle Traps
- ✓ Re-Programming of GENTEC Sensor Taps – To Activate Hygiene Flush

Case Study – Joan Kirner — Western Health

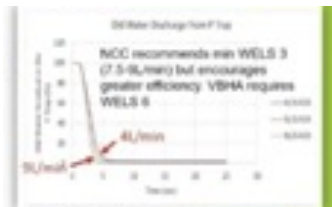
Investigation of Flow Rates through Traps

Flow rate and time: WELS scheme

- P traps effectively flushed with all flow rates.
 - Bottle traps will always have a residual volume. This decreases with increasing flow from 4L-9L/min
- Recommendations:
 1. Existing buildings: Modify traps, ensures flow >10s
 2. New buildings: Install P-traps



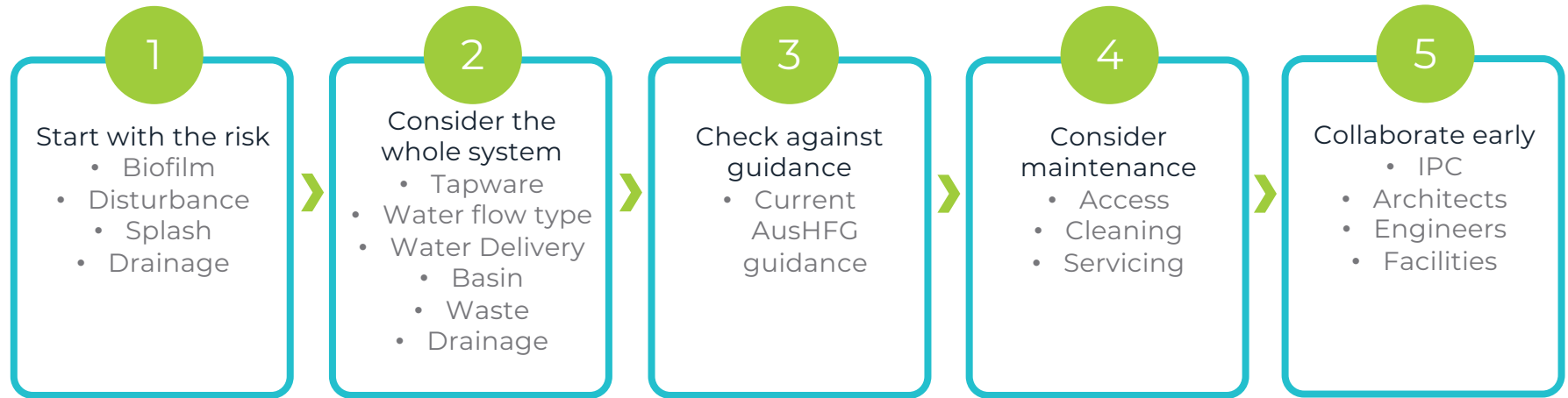
Commonwealth Dept. of Environment, Institute for Sustainable Futures, University of Technology, Sydney, 2018



Product Name	Flow Rate (L/min)	Flow Rate (L/min)	Flow Rate (L/min)	Flow Rate (L/min)	Flow Rate (L/min)	Flow Rate (L/min)	Flow Rate (L/min)	Flow Rate (L/min)
WELS 6	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5



Key Design Considerations for Healthcare Projects



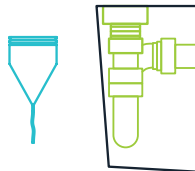
The Basin Is Part of the IPC Environment



Lead Free Hands-Free
Tapware with Hygiene
Flush



Basin Geometry —
Sloped Surfaces



Maintenance —
One-Way Valve &
Detachable
Shroud



Water Delivery



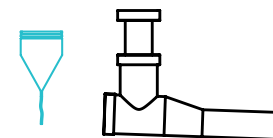
Laminar Flow



Rear Offset Waste



Drainage —
One-Way Valve
& SteriTrap



List of Projects installed with STERISAN® Basins

- ✓ New Maitland Hospital (NSW)
- ✓ Coffs Harbour Hospital (NSW)
- ✓ Royal Prince Alfred Hospital ICU (NSW)
- ✓ Hornsby Hospital (NSW)
- ✓ Nepean Hospital Stage 2 + ICU Areas (NSW)
- ✓ Nepean Dialysis Clinic (NSW)
- ✓ Matilda Private Hospital (NSW)
- ✓ Musselbrook Hospital (NSW)
- ✓ Maitland Private Hospital (NSW)
- ✓ Rockhampton Hospital (QLD)
- ✓ Nambour Hospital (QLD)
- ✓ Caboolture Cancer Clinic (QLD)
- ✓ Perth Day Hospital (WA)
- ✓ Debarl Yebarl Health (WA)
- ✓ Jabiru Health Centre (NT)
- ✓ Paula Fox Melanoma & Cancer Centre (VIC)
- ✓ Angliss Hospital (VIC)
- ✓ Phillip Island Community Hospital (VIC)
- ✓ Adeney Private Hospital (VIC)
- ✓ Footscray Hospital (VIC)
- ✓ Austin Hospital (VIC)
- ✓ Alfred Hospital (VIC)
- ✓ Royal Melbourne Hospital (VIC)
- ✓ Victorian Melanoma & Clinical Trials Clinic -
- ✓ Alfred Health (VIC)
- ✓ Maryvale Private Hospital (VIC)
- ✓ Eastern Health (VIC)
- ✓ Alpine Health (VIC)
- ✓ Nrunswick Private Hospital (VIC)
- ✓ Sunshine Hospital (VIC)
- ✓ Wonthaggi Hospital (VIC)
- ✓ Peninsula Private Hospital (VIC)
- ✓ Monash Hospital (VIC)
- ✓ Christchurch Hospital (NZ)

SCAN the QR Code to view a published study on biofilm in clinical basins

Sick sink syndrome:
A cautionary tale on the impact of
sustainability and climate resilience
measures in a newly constructed hospital





THANK YOU



Backup Slides

Australasian Health Facility Guidelines Requirements

Part D – Infection Prevention & Control — Handwash Basin Design

Reference: AusHFG Revision 8 – April 2025

Clinical handwash basins must be visible, accessible, and reserved for hand hygiene.

GENTEC basins are designed to fully comply with these AusHFG requirements.

Handwash Basin Types



Type A – Clinical Large ('Scrub')



Type B – Clinical Medium



Type C – Non-Clinical / Vanity

Handwash Basin, Taps and Waterspouts Design Principles (AusHFG 2025)

AusHFG Requirements including:

- Have no overflow
- Curved sides to minimise splashing and channel the water to the waste to avoid pooling
- Large enough for proper hand hygiene technique
- Wall-mounted for effective cleaning
- Spout and waste offset to reduce the risk of aerosolization of any biofilm that may have built up in the drain
- Waterproof splashback, easy-to-clean material
- Laminar flow to eliminate aerosolization of droplets
- Have taps that are fit for purpose
- Feature a detachable shroud that encloses the pipe fittings to ensure convenient access to the drainage system

Handwash basin design should ensure:

- drainage is easy to access and removed for regular cleaning of 'P' or 'S' traps to remove biofilm buildup
- drainage does not include a bottle trap drain
- drainage holes are located in the base of the handwash basin and not on the basin sides/walls.

Australasian Health Facility Guidelines Requirements

Type A – Clinical Handwash Basin – Large (Scrub Basin)

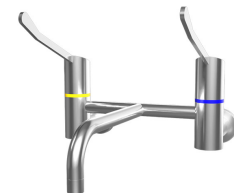
- Used by staff in the context of provision of clinical care in selected areas requiring clinical hand washing prior to undertaking selected procedures that may occur in non-operating room settings (e.g., delivery room).
- Large wall-mounted
- With hands-free taps that may be wall-mounted elbow taps, foot/knee operated, or electronic sensor taps, with warm and cold water delivered by a common spout.
- Spout and tap placement should have sufficient spout height that allows washing of hands up to the elbow.



PLUS2500M



GPG2500



GPCL15012



MVPMLF30150

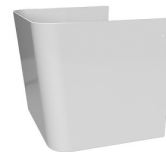
Australasian Health Facility Guidelines Requirements

Shroud

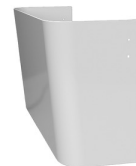
- Feature a detachable shroud that encloses the pipe fittings to ensure convenient access to the drainage system
- drainage is easy to access and removed for regular cleaning of 'P' or 'S' traps to remove biofilm buildup
- drainage does not include a bottle trap drain



- Manufactured in Stainless Steel and Powder Coated white to match the Basin
- Lightweight construction
- No Gap as this has been designed to recess into the underside of the Basin
- Easy to remove for servicing



SAN9011
(to suit Type C
Basin)



SAN9012
(to suit Type A
& B Basin)

Australasian Health Facility Guidelines Requirements

Type B – Clinical Handwash Basin – Medium

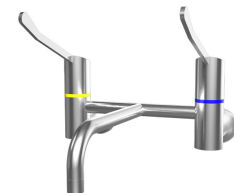
- Used by staff and visitors for patient care situations and for undertaking aseptic procedures.
- Medium wall-mounted
- The taps are typically wall-mounted with elbow or wrist hands-free operation, with warm/cold free-running water.
- Spout and tap placement should have sufficient spout height that allows washing of hands up to the elbow.



PLUS2500M



GPG2500



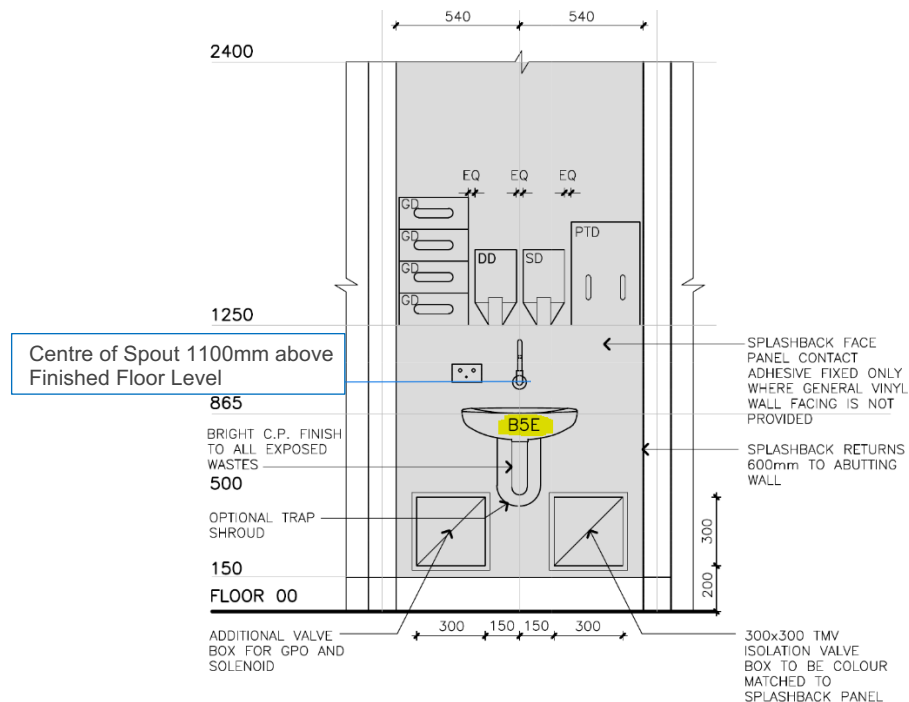
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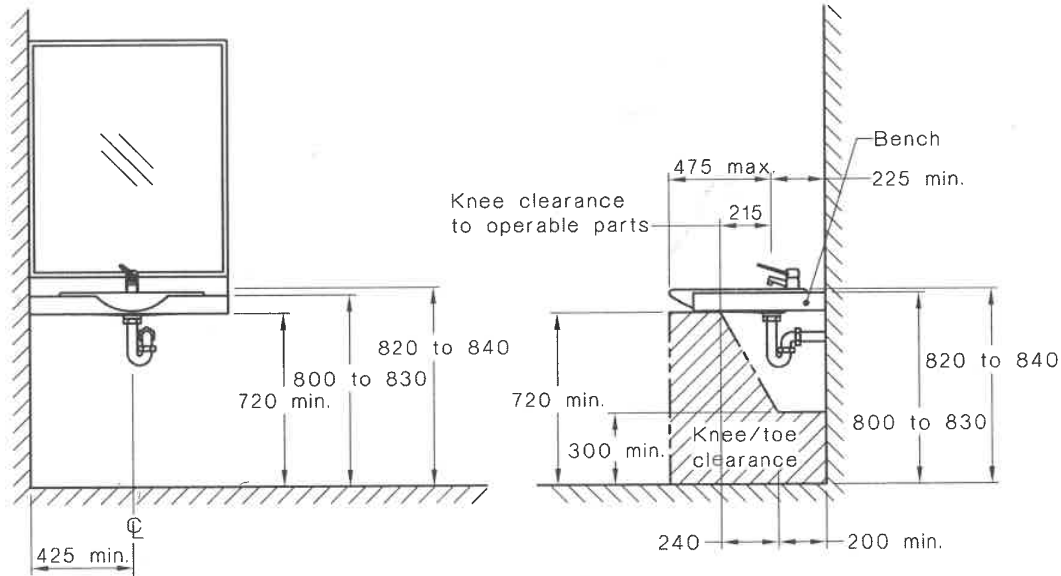
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Australasian Health Facility Guidelines Requirements

Mounting Height for Basin & Tap (Type A & B)



Mounting Height for Accessible Basin (Type C)



Australasian Health Facility Guidelines Requirements

Type C – Non-Clinical Handwash Basin – Small / Medium

- Used for non-clinical handwashing in the context of generally accepted community standards of hygiene. It is required in public, patient, and staff amenities and in areas of domestic preparation of food.
- Small wall-mounted basin, which may be part of a vanity unit.
- The taps are typically basin mounted.
- Supply warm and cold water. Cold water-only may be provided to Type C facilities in areas such as public amenities.
- For ease of cleaning and use, taps should be lever operated, in line with commercially available options (i.e., mixer style tap).



GPR1000



GPR2000D



NGMLF1000



NGMLF2000D