

South African Tap and Flow Rate Gap Analysis



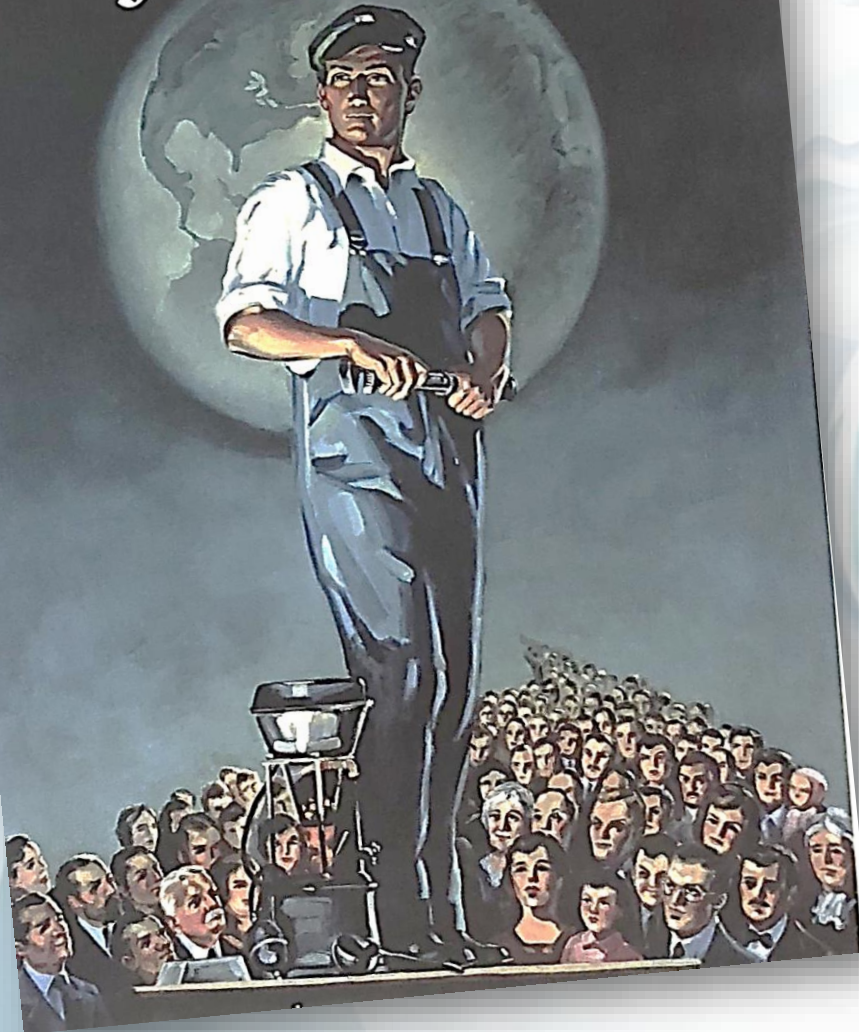
Herman Strauss
22 March 2023



South Africa's energy and water sustainability is at risk



The Plumber Protects the Health of the Nation



Water is critical.

- Health and sanitation
- Sustenance
- Removal of sewage
- Protection against sewage pathogens and gasses

Plumbing done incorrectly can cause serious harm

Legionnaires Disease

- Bacteria commonly found in water supplies
- If inhaled, it cause a potentially fatal lung infections
- Potentially fatal

Prevention:

- Water temperatures above 60°C



Plumbing done incorrectly can cause serious harm

Scalding

- Water that is too hot can cause potentially fatal burn wounds within seconds.

Prevention:

- Reduce water temperature to taps.

| Type of Burn | Time of exposure in minutes and seconds | | | | | | | |
|--------------|---|-------|-------|-------|--------|--------|--------|------------|
| Temp | 45°C | 50°C | 55°C | 60°C | 65°C | 70°C | 75°C | 80°C |
| Adult 3rd | >60 m (e) | 300 s | 28 s | 5.4 s | 2.0 s | 1.0 s | 0.7 s | 0.6 s (e) |
| Adult 2nd | >60 m (e) | 165 s | 15 s | 2.8 s | 1.0 s | 0.5 s | 0.36 s | 0.3 s (e) |
| Child 3rd | 50 m (e) | 105 s | 8 s | 1.5 s | 0.52 s | 0.27 s | 0.18 s | 0.1 s (e) |
| Child 2nd | 30 m (e) | 45 s | 3.2 s | 0.7 s | 0.27 s | 0.14 s | <0.1 s | <0.1 s (e) |

(e) = estimated

Plumbing done incorrectly can cause serious harm

Explosions

- A geyser stores water under pressure at high temperatures.
- If safety components fail, it can cause a fatal explosion

Prevention:

- Installation and components that complies with national standards.



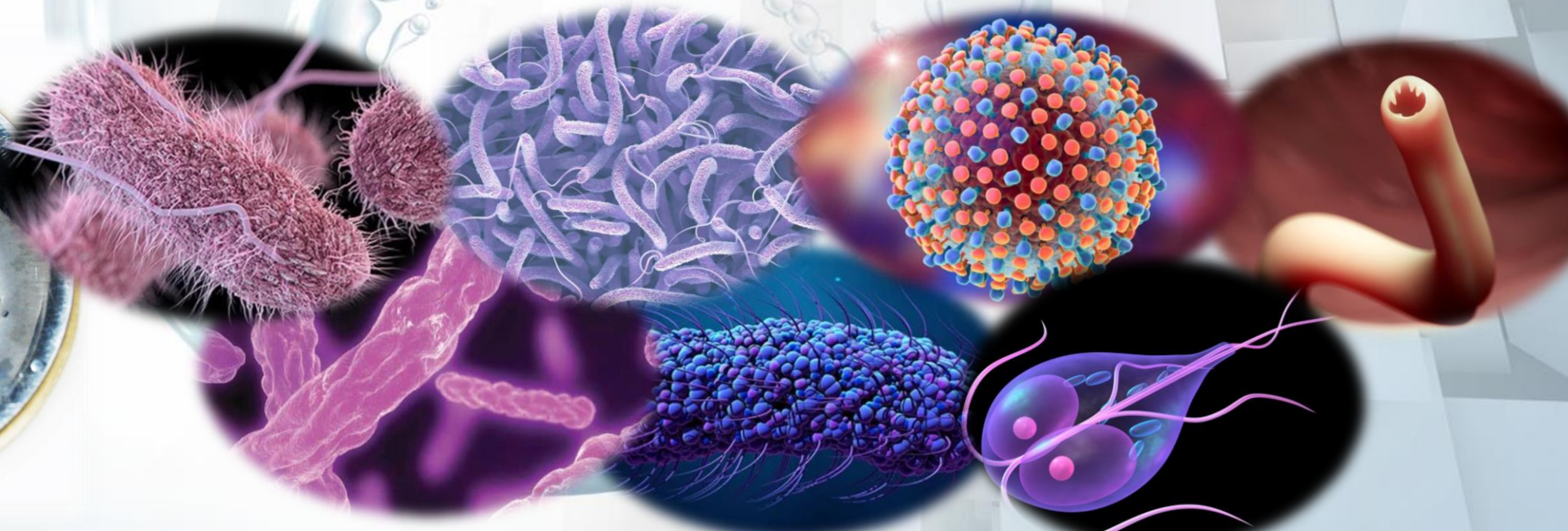
Plumbing done incorrectly can cause serious harm

Sewer pathogens

- Decomposing human faeces cause toxic gasses, and
- Can contain dangerous disease
- Living spaces in a building must be protected from such pathogens

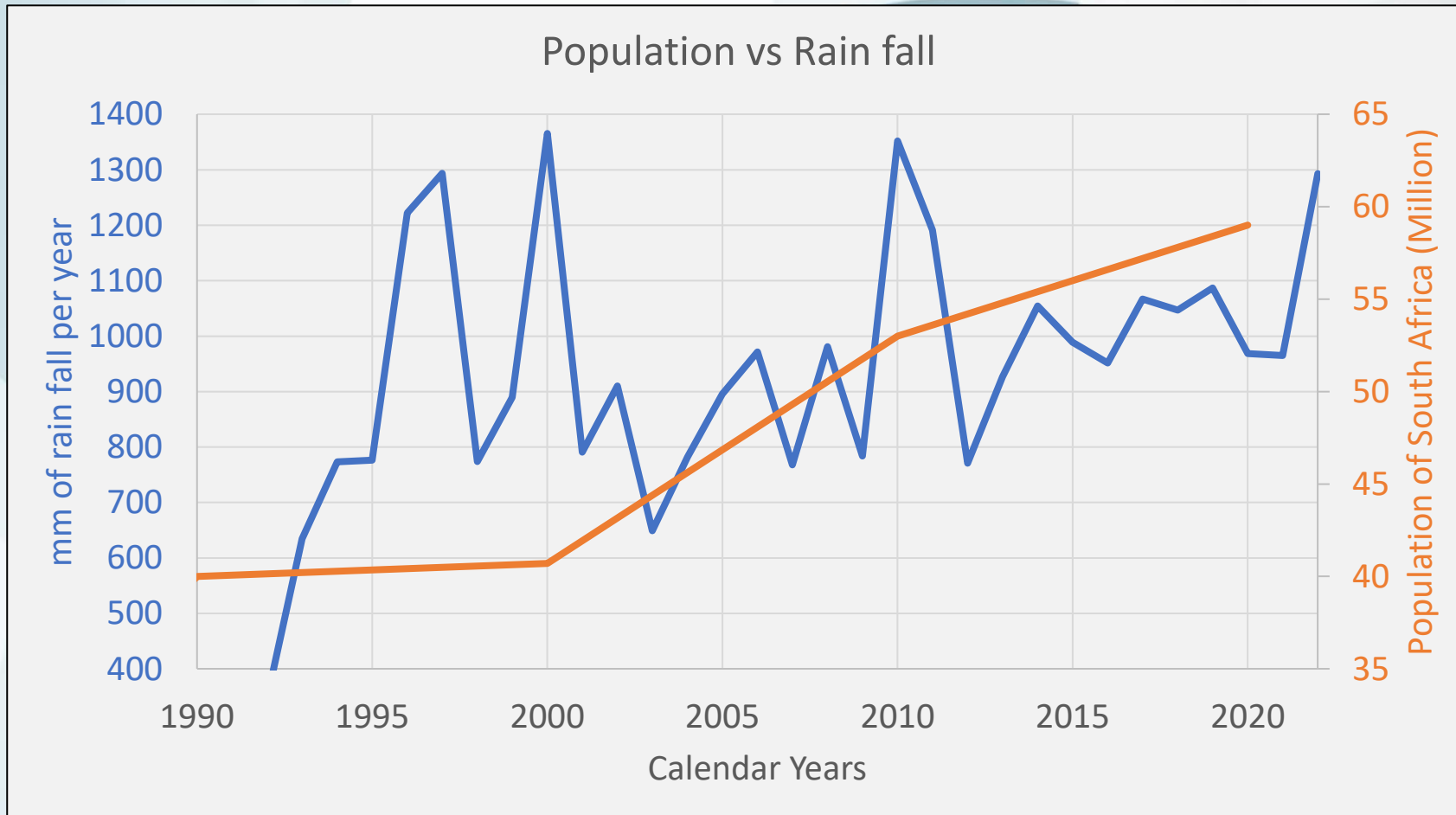
Prevention:

- Installation and components that complies with national standards.



Will we have enough
water for Tomorrow?





Rainfall data as published by: Alan Robert Clark (<http://ytdp.ee.wits.ac.za/rain.html>)

Population data as published by: 

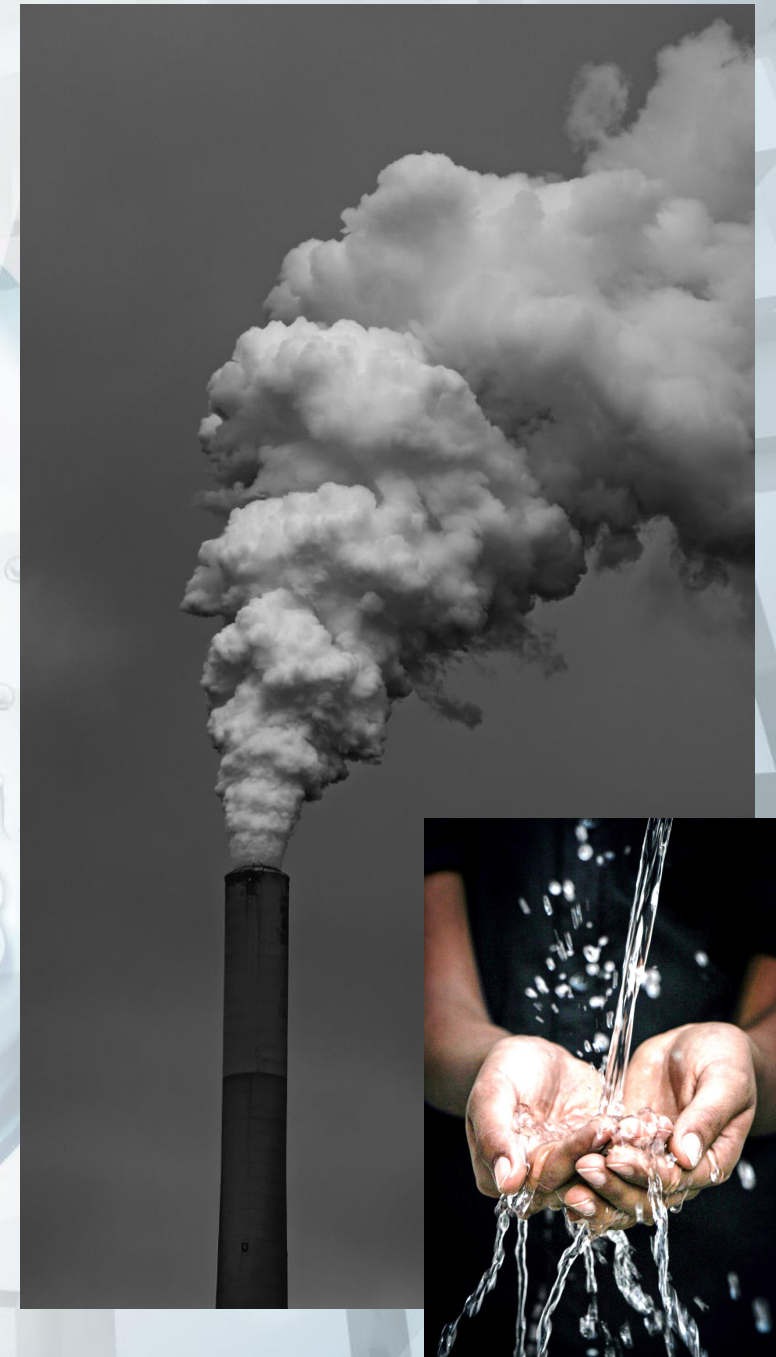
<https://www.macrotrends.net/countries/ZAF/south-africa/population-growth-rate>

Various projects attempted to provide more water, e.g. Reverse Osmoses / Desalination

- Requires high energy input
- Most energy is still derived from burning coal

Projects are important for specific objectives, but is not a long term solution that can make a large scale difference

To improve water sustainability, the USE of water must be addressed



Heating water consumes a significant amount of the household energy



Every drop of water that is saved, also saves energy and reduce carbon emissions.

Households and industries

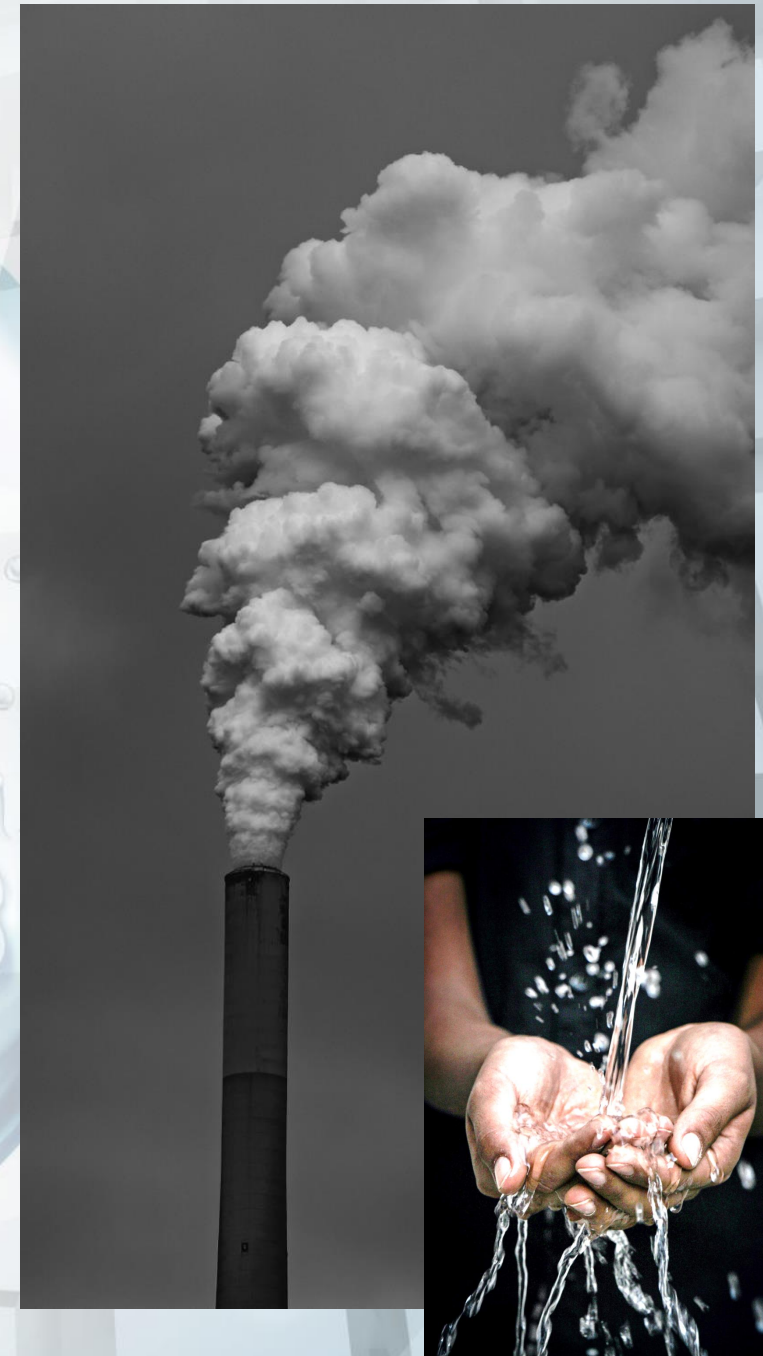
- Heating of hot water for basic sanitation.
- Food and beverage preparation
- Water used in industrial processes

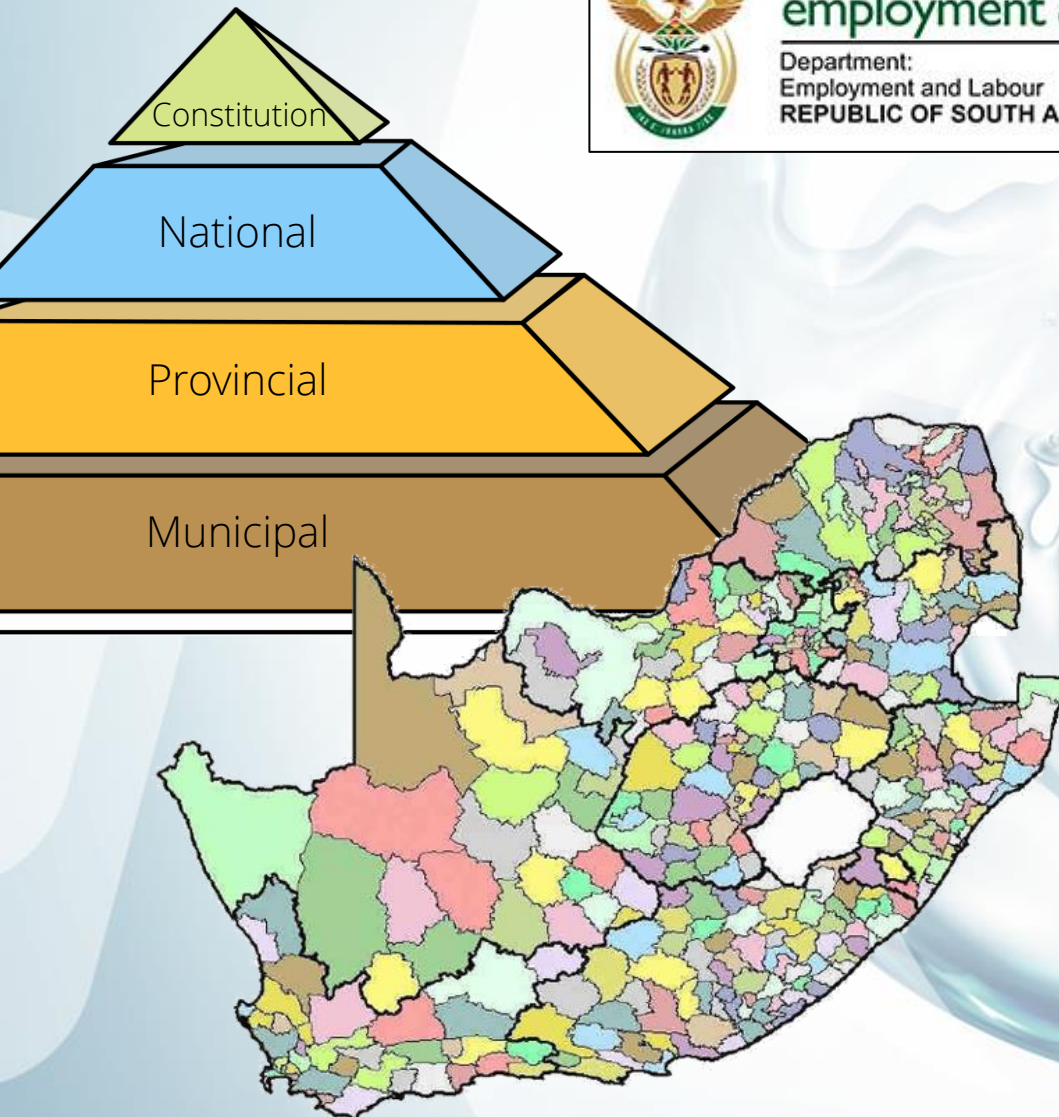
Water supply infrastructure

- Collection of water
- Water treatment
- Distribution of water
- Maintenance of distribution networks

Sewage infrastructure

- Treatment of sewage
- Maintenance of infrastructure





National Building Regulations (DTIC)

- Requires compliance with Part P of the regulations (e.g. SANS 10400-P)
- Consumer protection act

Water Services Regulations (DWS)

- Requires compliance to:
 - SANS 10254 (Installation of geysers)
 - SANS 10252-1 (Water supply installations)
 - SANS 10252-2 (Drainage installations)

Pressure Equipment Regulations (DEL)

- Requires compliance of geysers to the product standard (SANS 151) and installation to SANS 10254



the dtic

Department:
Trade, Industry and Competition
REPUBLIC OF SOUTH AFRICA



**Building control regulations, only address drainage /
sewage, not water supply.**

BCO – does not inspect water supply



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

**Water services regulations require compliance to
SANS standards,**

There is no national enforcement



NATIONAL WATER AND SANITATION MASTERPLAN

Action item number 1.4.3

“Establish Water Efficiency Labelling and Standards (WELS) Scheme”

Target date 2025

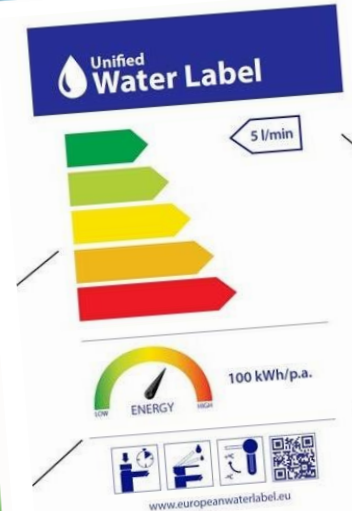
Known / Perceived Gaps:

- Current SANS standards are not aligned with each other.
 - ❖ Verification and Enforcement is not possible without alignment
- Current SANS standards are not aligned with international standards
 - ❖ Limits the scope of available products in SA
 - ❖ Prevent efficient products from being sold in SA
 - ❖ Technical barriers to trade (import and export)



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA





<https://www.clasp.ngo>



<https://www.sanedi.org.za>



<https://jackstrasolutions.co.za>



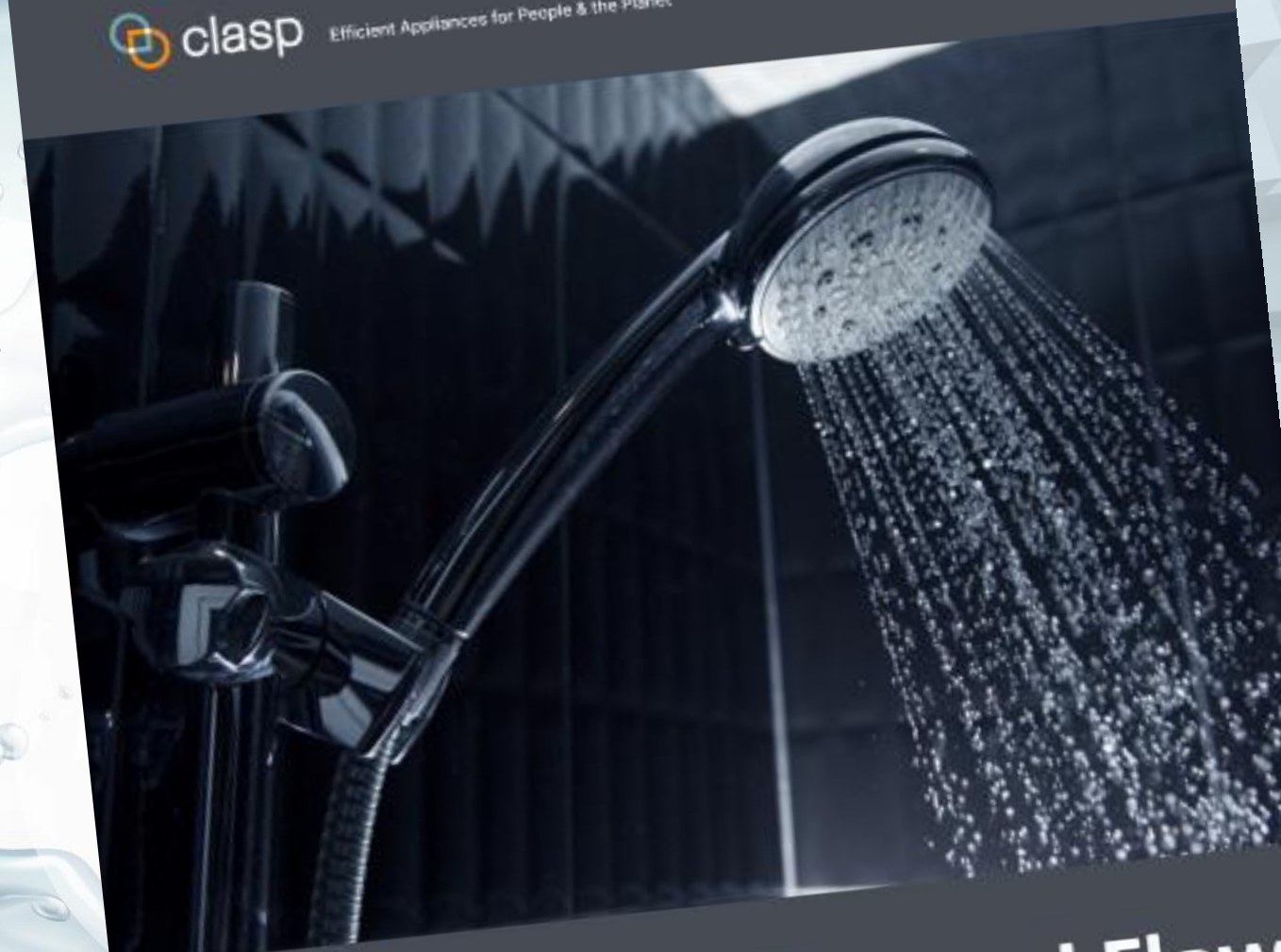
South African Tap and Flow Rate Gap Analysis

Published: January 2022

Objective:
To determine gaps that might hinder implementation of a WELS

<https://www.clasp.ngo/updates/clasp-supports-water-solutions-in-increasingly-dry-south-africa/>

 clasp Efficient Appliances for People & the Planet



South African Tap and Flow Rate Gap Analysis

The study included analysis of the following:

- Alignment of the 9 SANS tap standards
- Alignment of tap standards to SANS installation and efficiency standards

ISBN 978-0-626-35904-1

SANS 10252-1:2018
Edition 3.2

SOUTH AFRICAN NATIONAL STANDARD

Water supply and drainage for buildings

Part 1: Water supply installations for buildings

ISBN 978-0-626-33869-5

SANS 226:2016
Edition 5.3

SOUTH AFRICA

Water taps (meta

ISBN 978-0-626-31852-9

SANS 1808-30:2004
Edition 1.1

SOUTH AFRICA

**Water supply an
components**

Part 30: Laborat

ISBN 978-0-626-21876-8

SANS 180

Any reference to SA
to be a refe
(Government Notice No. 1373

SOUTH AFRICAN NATIONAL STA

**Water supply and distribution system
components**

The study included analysis of the following:

- Alignment of SANS standards with international standards



Tap Description

Standard

| | |
|---|--------------|
| Tap (metal body) | SANS 226 |
| Water taps (plastic bodies). | SANS 1021 |
| Single control mixer taps. | SANS 1480 |
| Metering taps and valves (metallic bodies). | SANS 1808-09 |
| Drinking fountain taps. | SANS 1808-16 |
| Laboratory water taps. | SANS 1808-30 |
| Electronically operated taps and valves. | SANS 1808-35 |
| Single-control mixer taps (plastics). | SANS 1808-37 |
| Demand type water taps. | SANS 1808-66 |



SABS

South African Bureau of Standards

SABS-TC 60

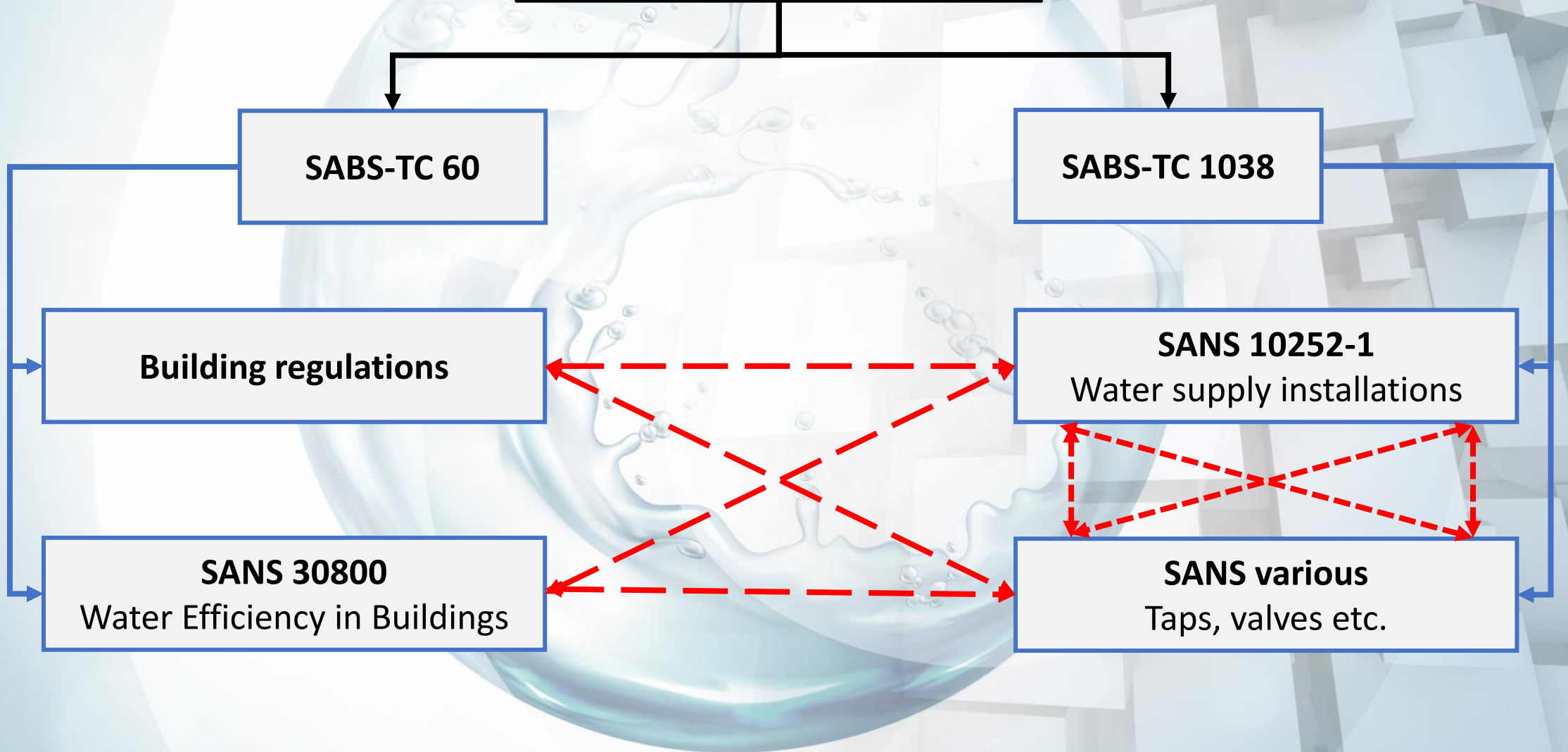
SABS-TC 1038

Building regulations

SANS 10252-1
Water supply installations

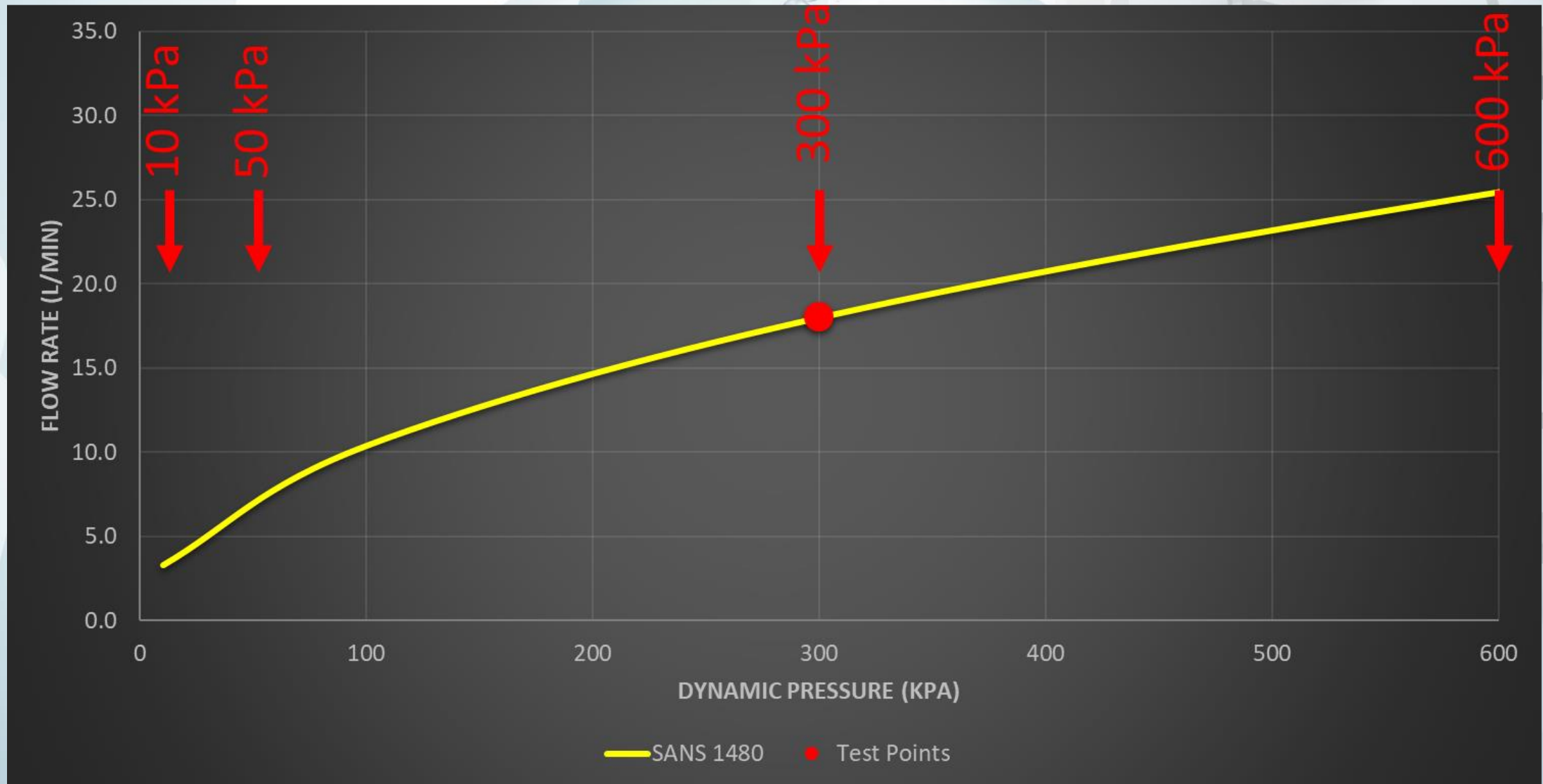
SANS 30800
Water Efficiency in Buildings

SANS various
Taps, valves etc.

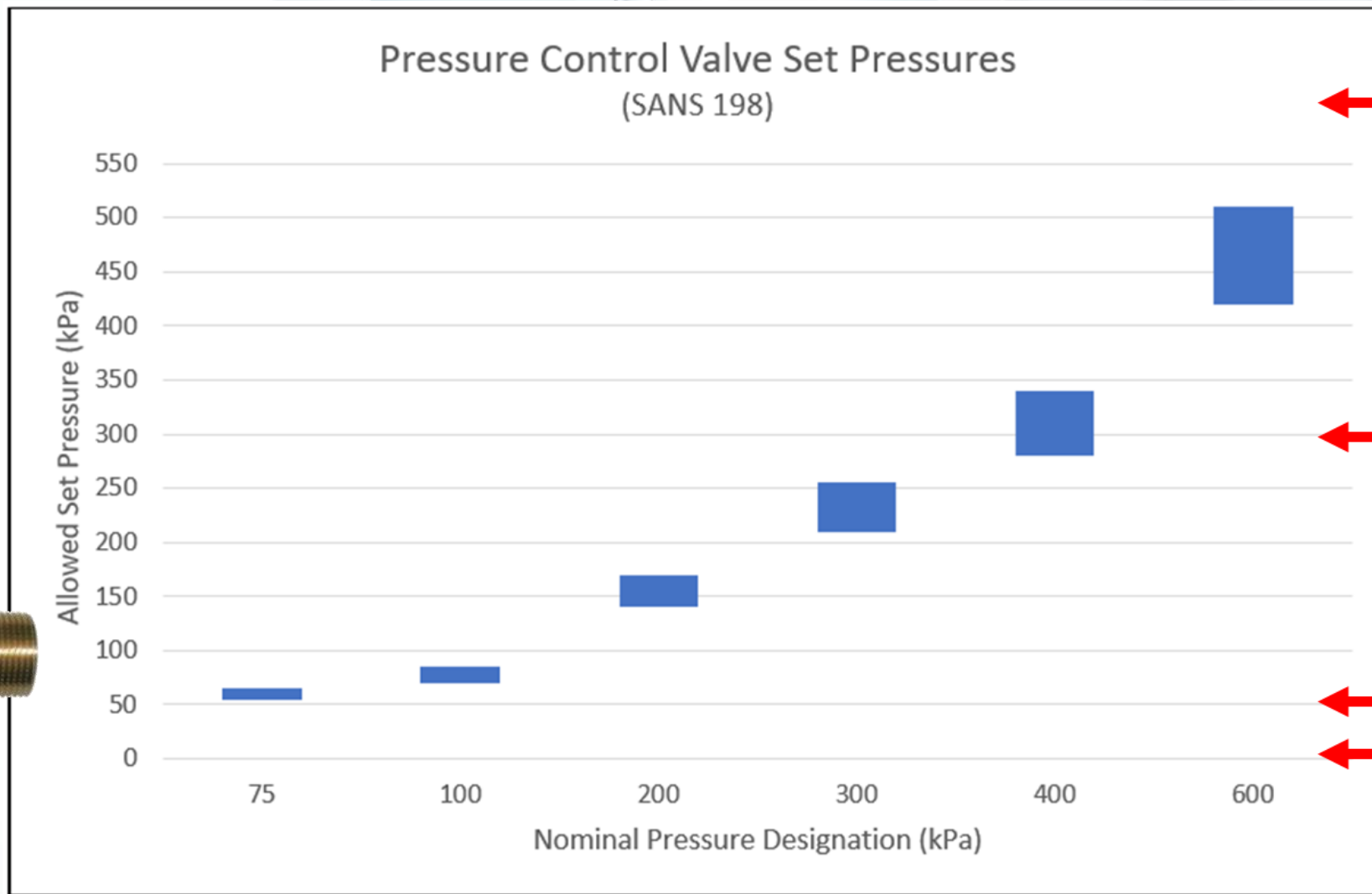


Water pressure influences water flow rate

All references to a flow rate must indicate at what water pressure it is measured



TAPS can be supplied with water at different water pressures



← 600 kPa

← 300 kPa

← 50 kPa

← 10 kPa

Bath Mixer

Minimum Flow Rate Requirement
Based on fixed orifice flow rates

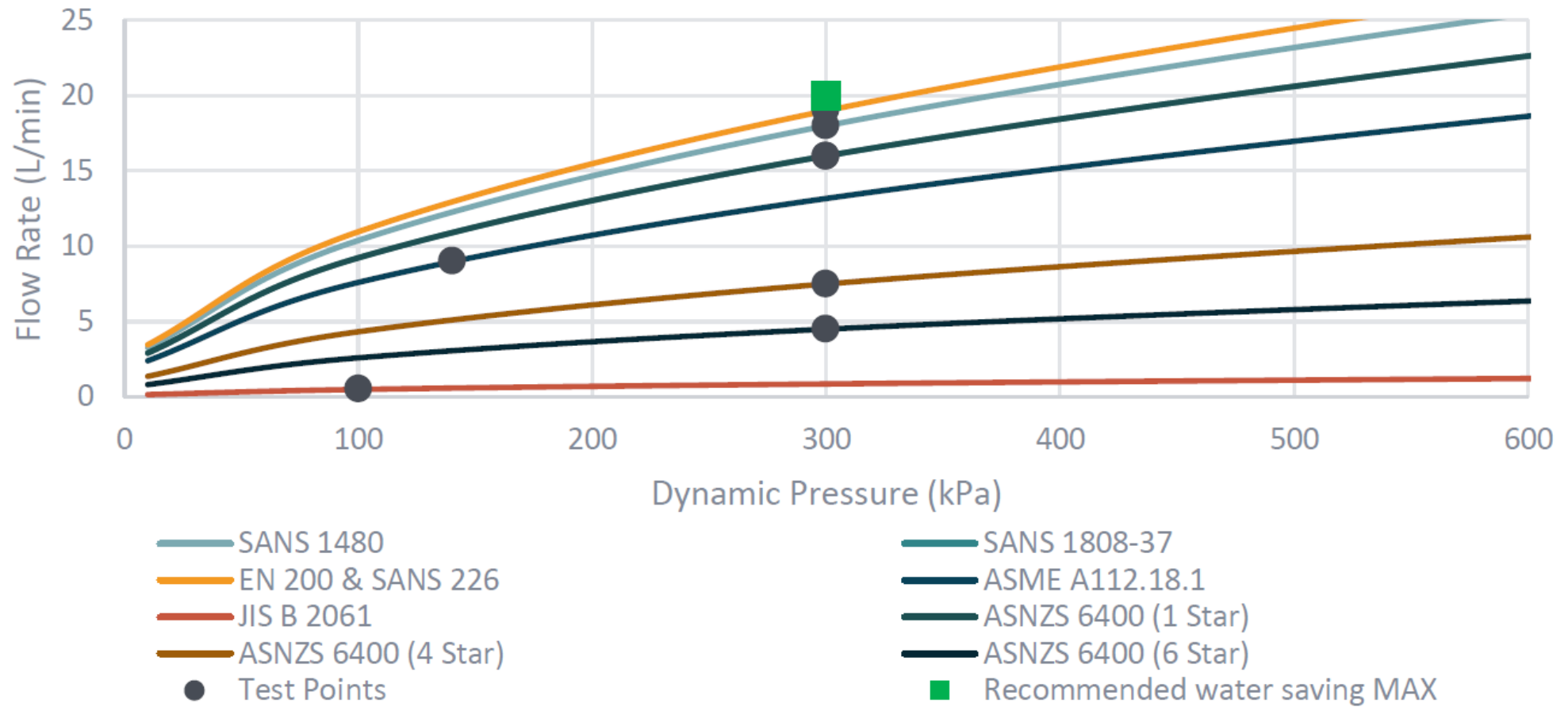


Figure 14 Bath Tap (SP) comparison

Worst case scenario comparison. Where flow regulators is used the flow curves will be flatter.

Example:

Tap Standards:



0 – 12 l/min



15mm: 0 – 9 l/min
20mm: 0 – 18 l/min)

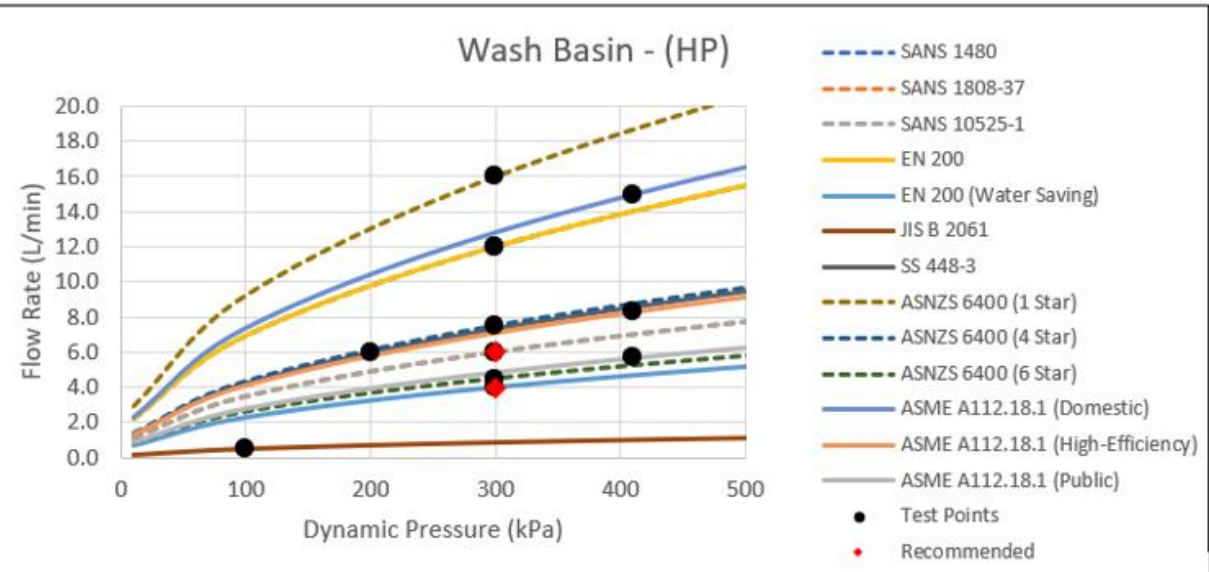


0 – 12 l/min

Installation:

SANS 10252-1 (0 – 6 l/min)

SANS 3088 0 – 5 l/min



South African Showerheads testing report

Published: October 2022

Objective:

To establish a base line of shower head flow rates in South Africa

<https://www.clasp.ngo/research/all/south-african-shower-heads-testing-report/>

 clasp Efficient Appliances for People & the Planet

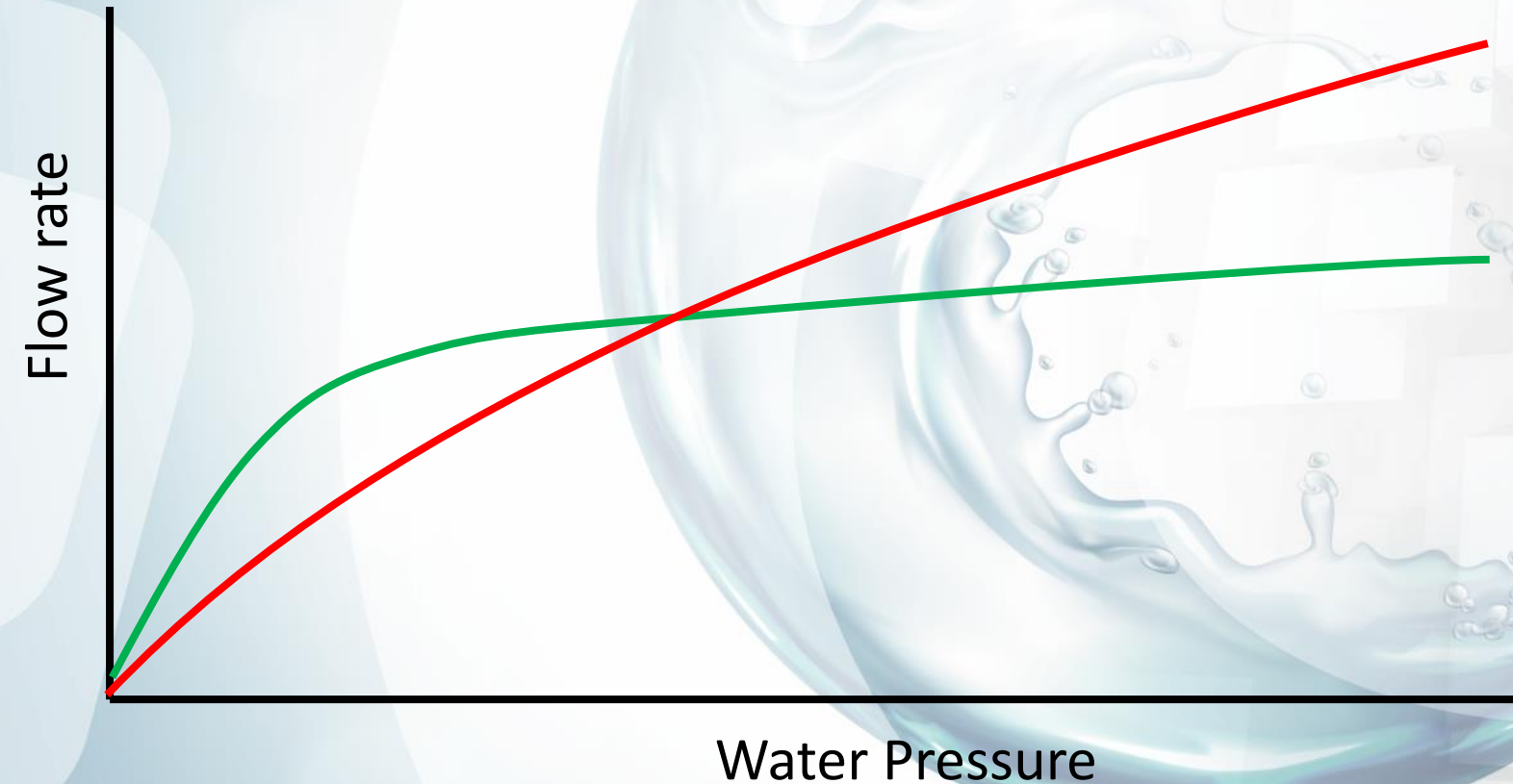


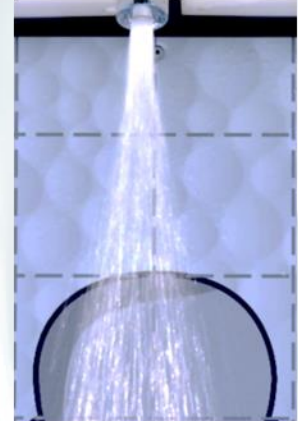
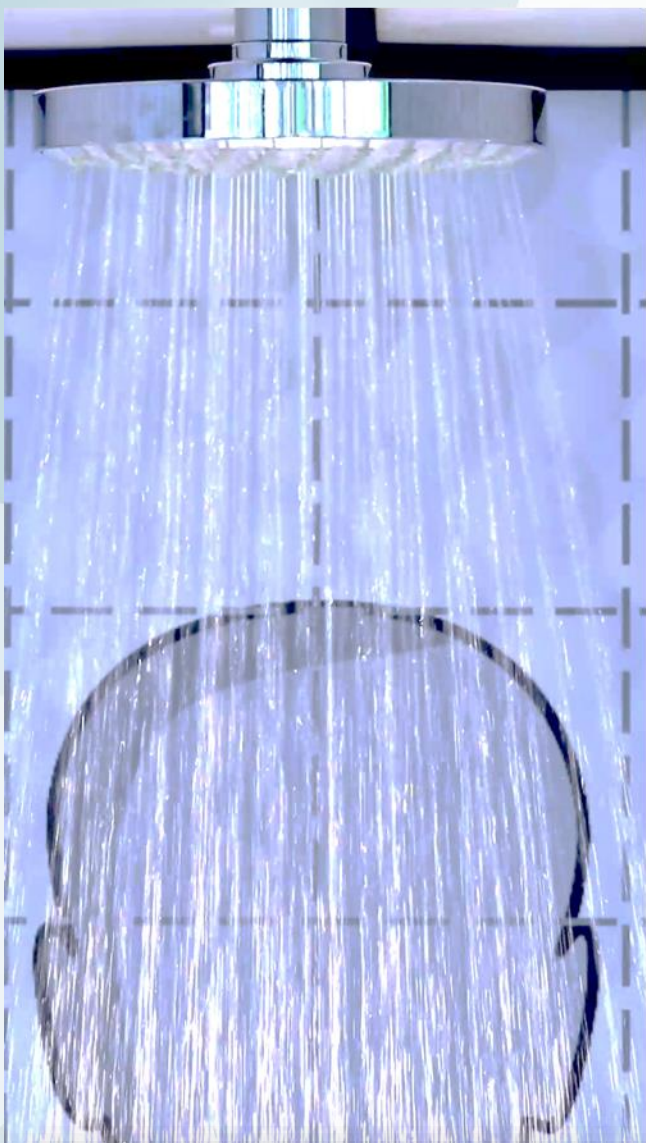
South African
Shower Heads
Testing Report

OCTOBER 2022

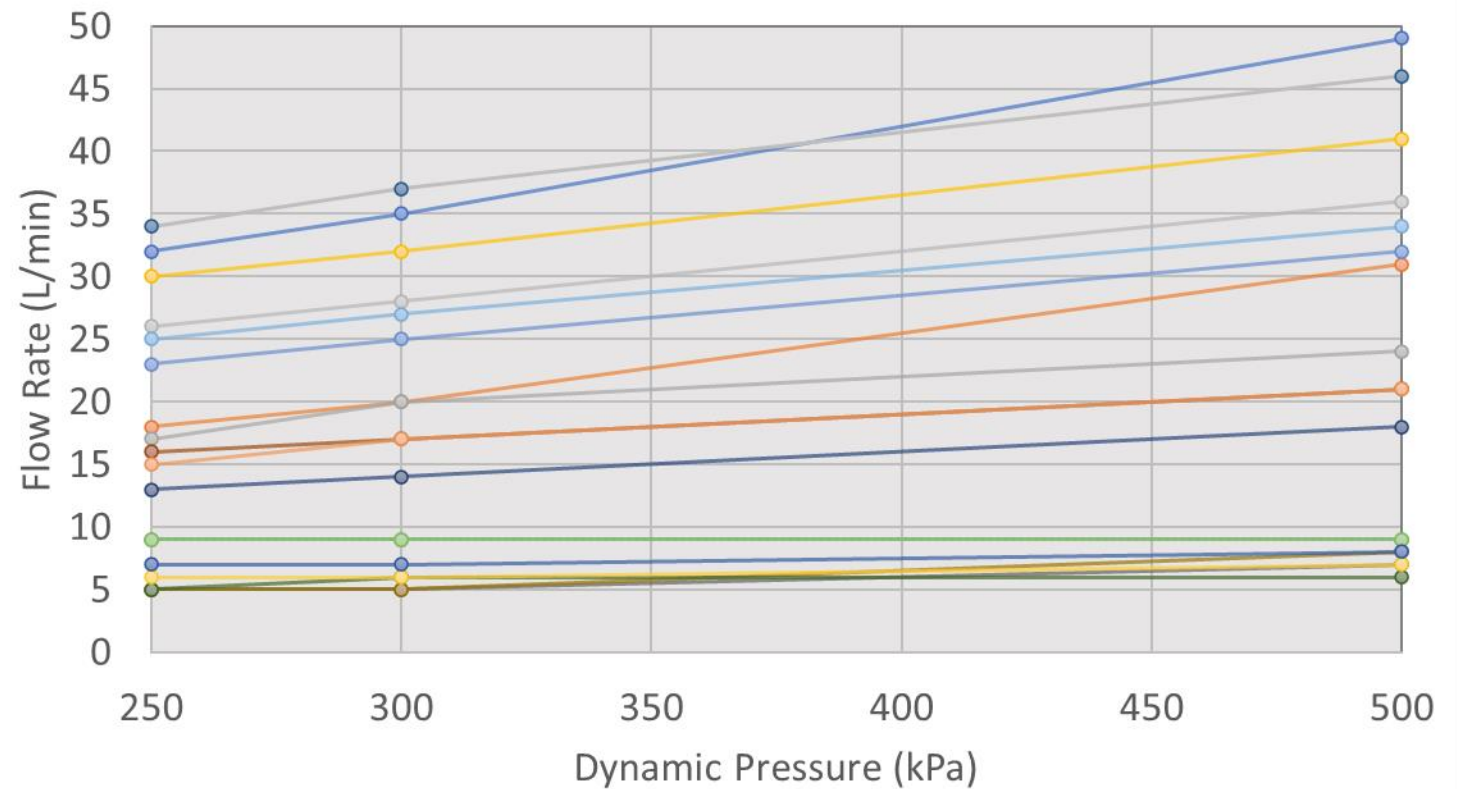
Showers are significant contributors to water usage.

- There is no standard for shower heads
- Without a standard the usage cannot be controlled (voluntary or legislative)
- Benchmark tests were conducted





Depiction of Shower head flow rates

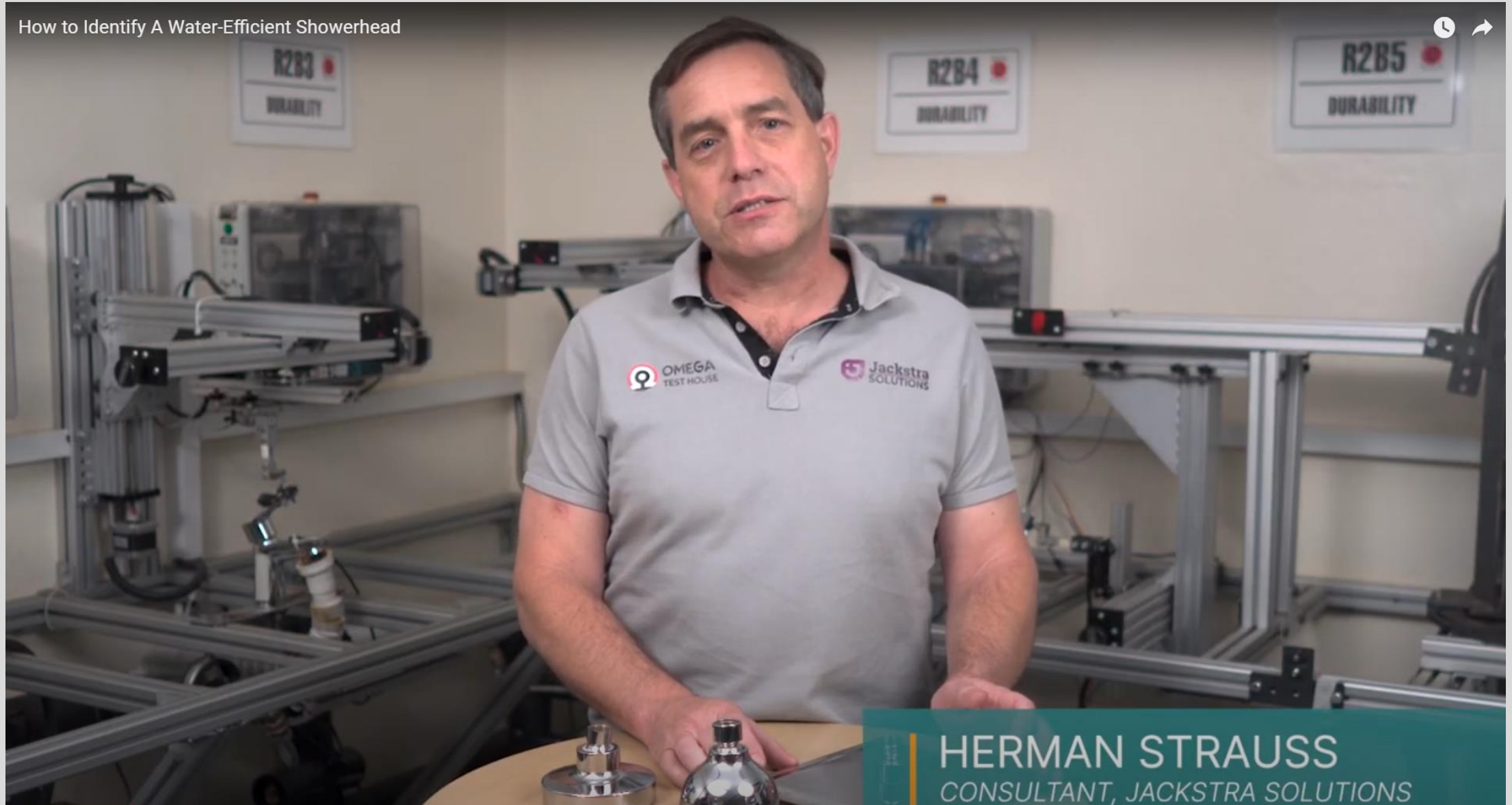


OMEGA
TEST HOUSE

<https://www.youtube.com/watch?v=adWIWzGEsVI>



How to Identify A Water-Efficient Showerhead



HERMAN STRAUSS
CONSULTANT, JACKSTRA SOLUTIONS

How to Identify A Water-Efficient Showerhead



- **No flow regulation**
- **Unnecessarily high flow rate**

How to Identify A Water-Efficient Showerhead



- No flow regulation
- Unnecessarily high flow rate

How to Identify A Water-Efficient Showerhead



- Greater flow rate control
- More control over temperature



The focus should not be to use **less** water,
The focus must be, to use **JUST ENOUGH!**



A toilet flushing less than 3 liter leads to blocked sewage systems. To clean this more water is used than what was saved.

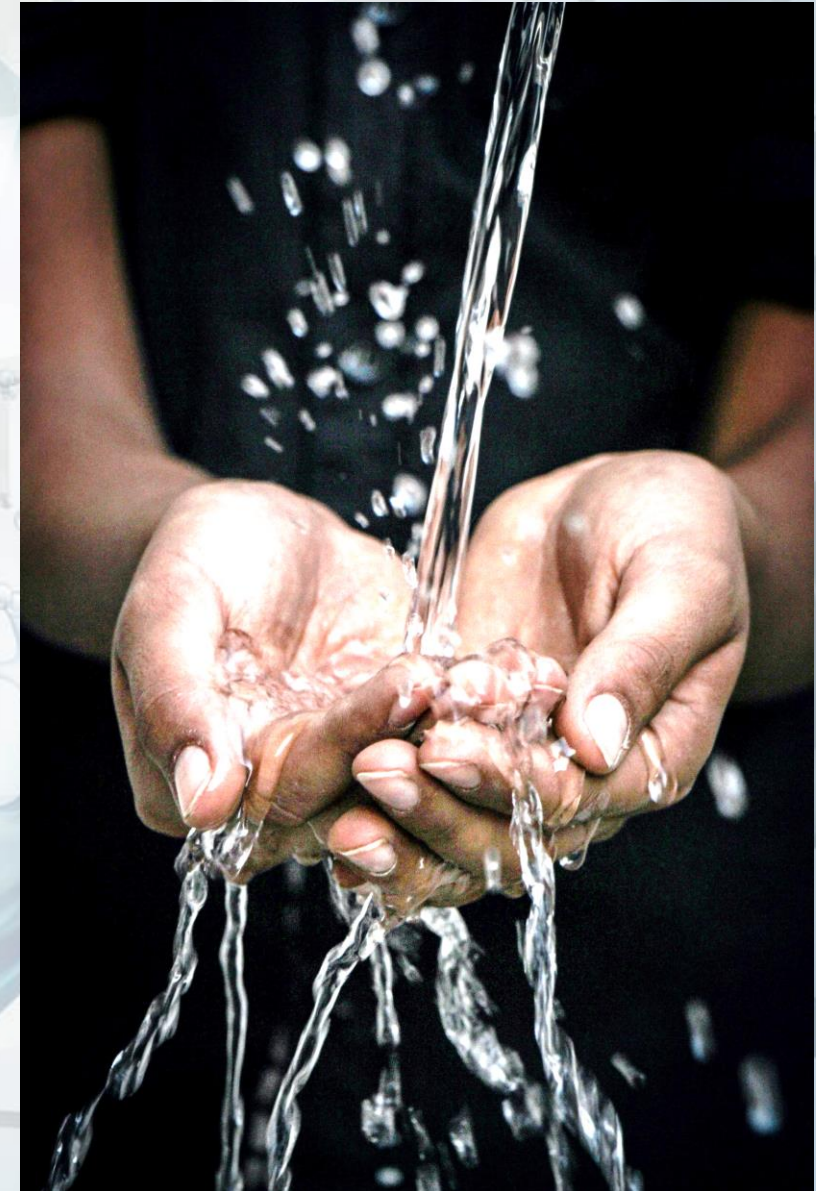
A shower that does not feel like a shower leads people to shower longer, or tamper with the flow control



Outdoor taps must be ready for fire protection, a low flow can risk safety.

The good news is that work already started on alignment with standards.

- Tap standards are currently under review
- A project have been opened to compile a shower head standard
- Awaiting confirmation of the review of the installation standards
- SABS participated in the drafting of ISO 316 “Water efficiency labelling programmes – requirements with guidance for implementation” This paves the way for a WELS in SA



What happens next? (and what can you do?)

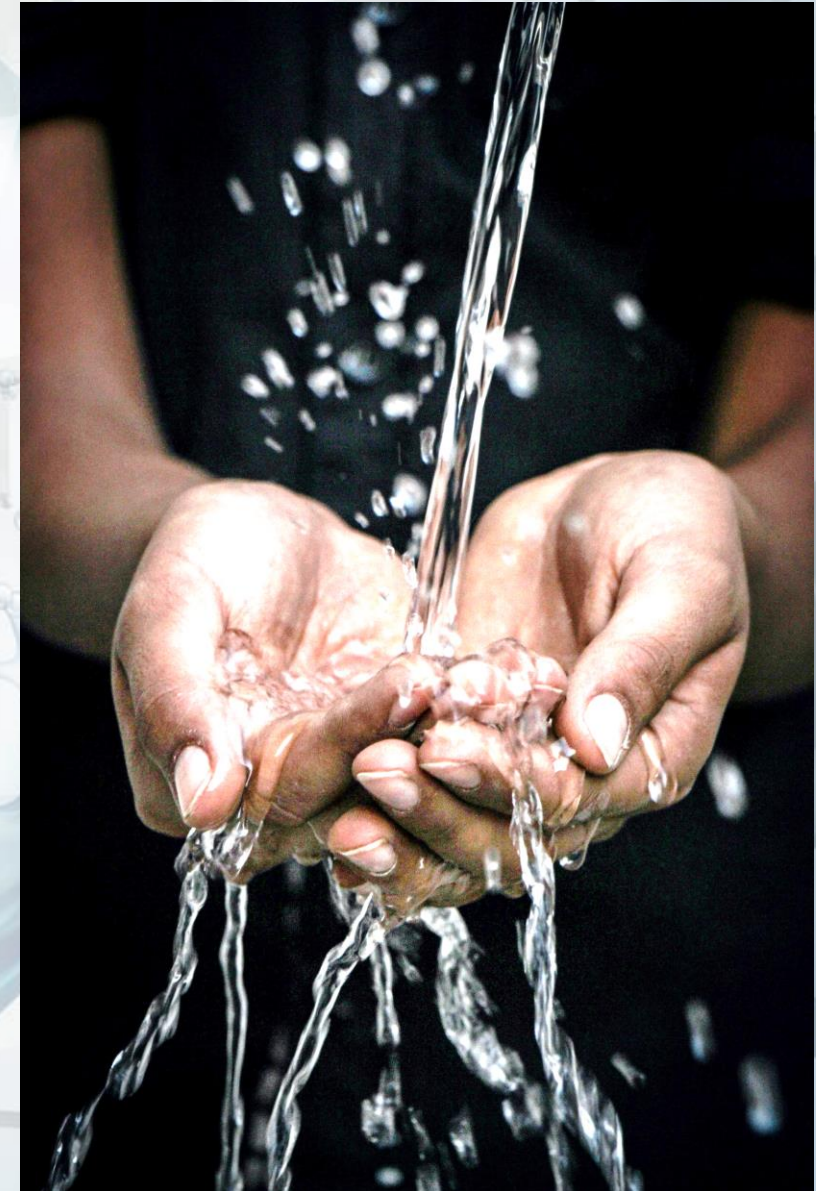
The process of aligning standards happens within the SABS structures.

- If you are part of these, please participate actively
- If you have something to offer, please join the committees
- If you just want to send in some comments, please do so.

https://www.sabs.co.za/Standardss/standards_involve.asp

DWS to introduce a Water Efficiency Labelling Scheme.

- Support this initiative
- Participate in all phases of the project
- Help to present a holistic view



Collaboration is important if we want to make lasting changes.

- More voluntary initiative to promote water and energy savings are beneficial
- Avoid working in silos, it leads to misalignment.
- Don't underestimate the value of standards in these processes, it prevents unintended consequences.

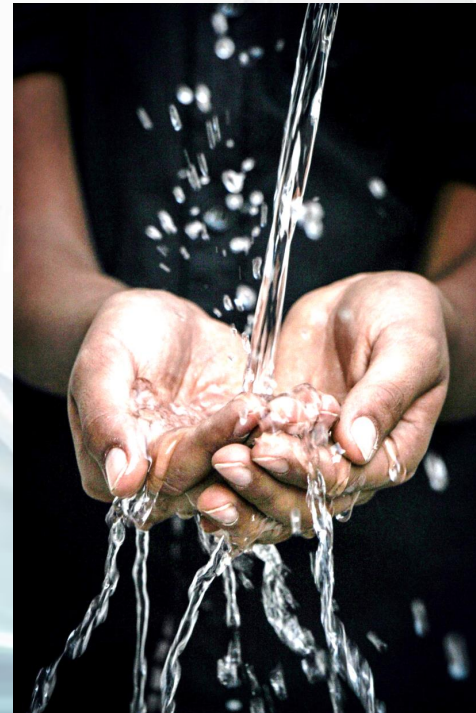


e.g. There is a place for low flush toilets, but spending resources to develop the toilet only without considering the infrastructure around leads to losses.

Let us practice what we preach.

Each drop/watt that you save, help make sure there is enough for everyone.

Each drop/watt that you save, teaches your kids to do the same. They learn from what you do not what you say.



Thank you

Herman Strauss
herman@strausse.co.za