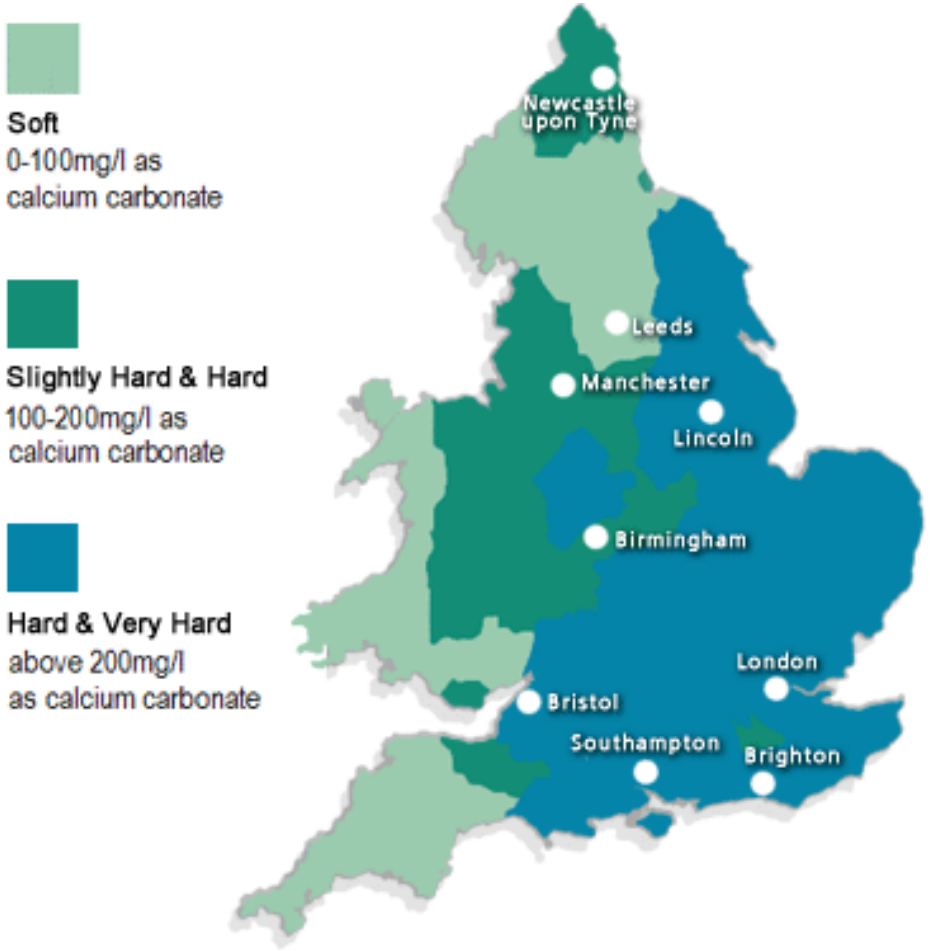
GEYSER

THERMAL ENERGY

Scale is one of the largest causes of energy wastage & equipment breakdowns in the UK.



Awards

2degrees

NATIONAL ACR & HEAT PUMP AWARDS 2016 WINNER

Rushlight Awards

building better healthcare awards 2015

Geyser Heat Pumps

Geyser Heat Pumps

- High COP
- Can be used with supply water down to 4˚C
- Can heat water up to 65˚C
- Modulating
- Can use multiple energy sources (air, ground, borehole, water & seawater)
- 73kW modules - no upper demand limit
- Can service potable hot water and heating.
- Can be used for swimming pools to extend the holiday season
- Can be used to cool and heat at the same time

Scale Issues

Scale blocks the pathways in heat exchangers and reduces the inner diameter of pipes and elbows, leading to restrictions in flow rate and pressure loss problems in systems.

Scale often becomes encrusted on internal moving parts of pumps, valves, solenoids and other components, which leads to premature failures.

In any boiler, water heater or heat pump, heat exchangers and heating elements can quickly become coated with scale. This significantly reduces system efficiency and increases both energy consumption and operating costs for end users.

Scale Issues

Pumps: Increased resistance – higher electrical usage – breakdown

Diverter valves: Almost all failures are due to scale

Automatic air vents: Almost all failures are due to scale – increased air in pipework reduces efficiencies

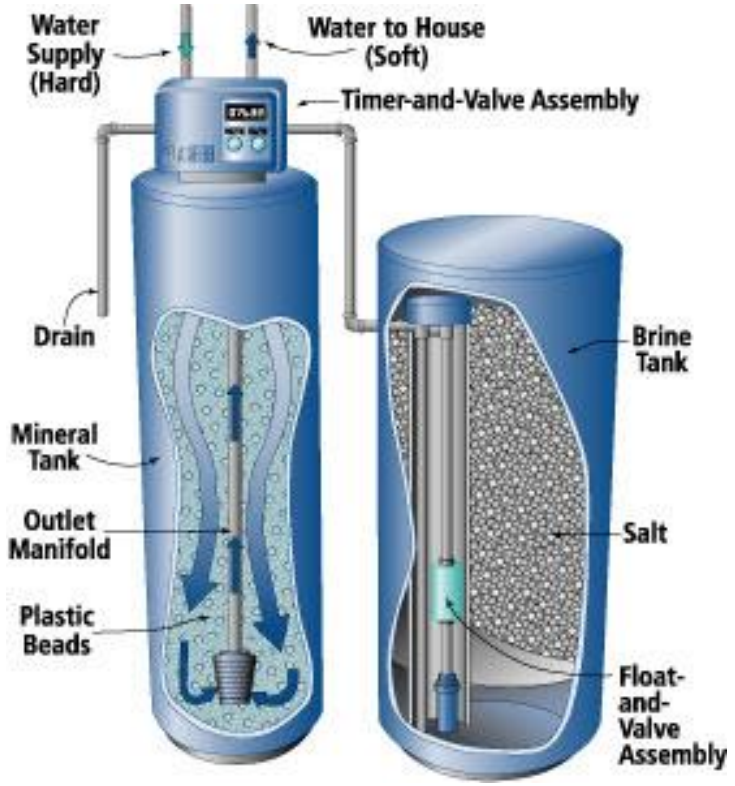
Sensors: Scale on sensors give false readings – can increase the costs by 40%

Taps: Causes leaks and failures

Sensors – the hidden cost of limescale

Solutions

- ✓ Expensive
- ✓ Needs constant monitoring
- ✓ Needs constant salt re-fill
- ✓ Contaminates ground water with salt
- ✓ Remove healthy minerals
- ✓ Is the standard solution for most businesses
- ✓ Backwash wastes thousands of litres of water daily
- ✓ Require two cold water supplies (soft and hard)
- ✓ Old technology



Why the need for an alternative?

- ✓ Softeners work well at scale prevention but have well understood limitations of use
- ✓ High operating and maintenance costs
- ✓ High volumes of water wasted in regeneration cycle
- ✓ USA and EU have either implemented or are considering bans or restrictions on use
- ✓ Discharge of brine/chlorides in waste water is becoming a significant environmental issue
- ✓ Discharge is increasing TDS (Total Dissolved Solids) in waste water
- ✓ Contamination of rivers and ground water is preventing reuse for drinking or irrigation
- ✓ Parts of USA - Spain - Portugal - Cyprus are already having to desalinate ground water
- ✓ Cumulative effect means billions of cubic meters wasted each year

TAC – Template Assisted Crystallization

- ✓ Up to 99.6% effective
- ✓ Virtually maintenance free
- ✓ Does not waste any water
- ✓ Does not use any chemicals
- ✓ Does not use any electricity
- ✓ Compact - easy to fit
- ✓ Retains healthy minerals
- ✓ Is effective up to 1285ppm

TAC – What is it?

- ✓ TAC is a proven technology which is equal in performance to ion exchange but has none of the limitations of use. Unlike ion exchange or polyphosphate, TAC does not sequester the calcium. TAC operates at the molecular level and converts the dissolved calcium, magnesium and bicarbonate (CaC03) through a catalytic reaction into inert microscopic crystals which no longer have the propensity to stick and form hard scale.

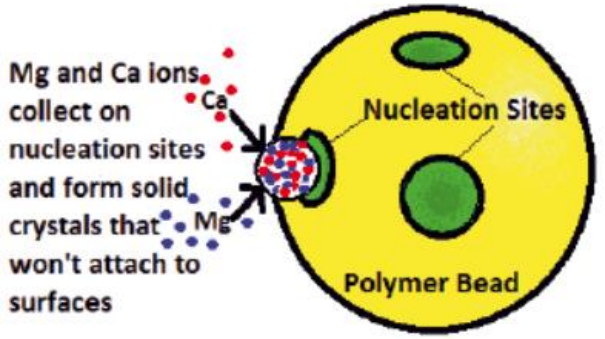
- ✓ Resins and media which sequester calcium at some point become saturated and cease to function. At that point, water softeners regenerate, and cartridges are changed. The saturation point is determined by the levels of CaC03 in the supply water - higher CaC03 means a quicker saturation point. This translates to more frequent regeneration for softeners, or shorter life in service for cartridges.

- ✓ TAC has none of those challenges. In food services cartridges, TAC has a recommended one year life. In water softener alternatives, media is changed after 3 years.

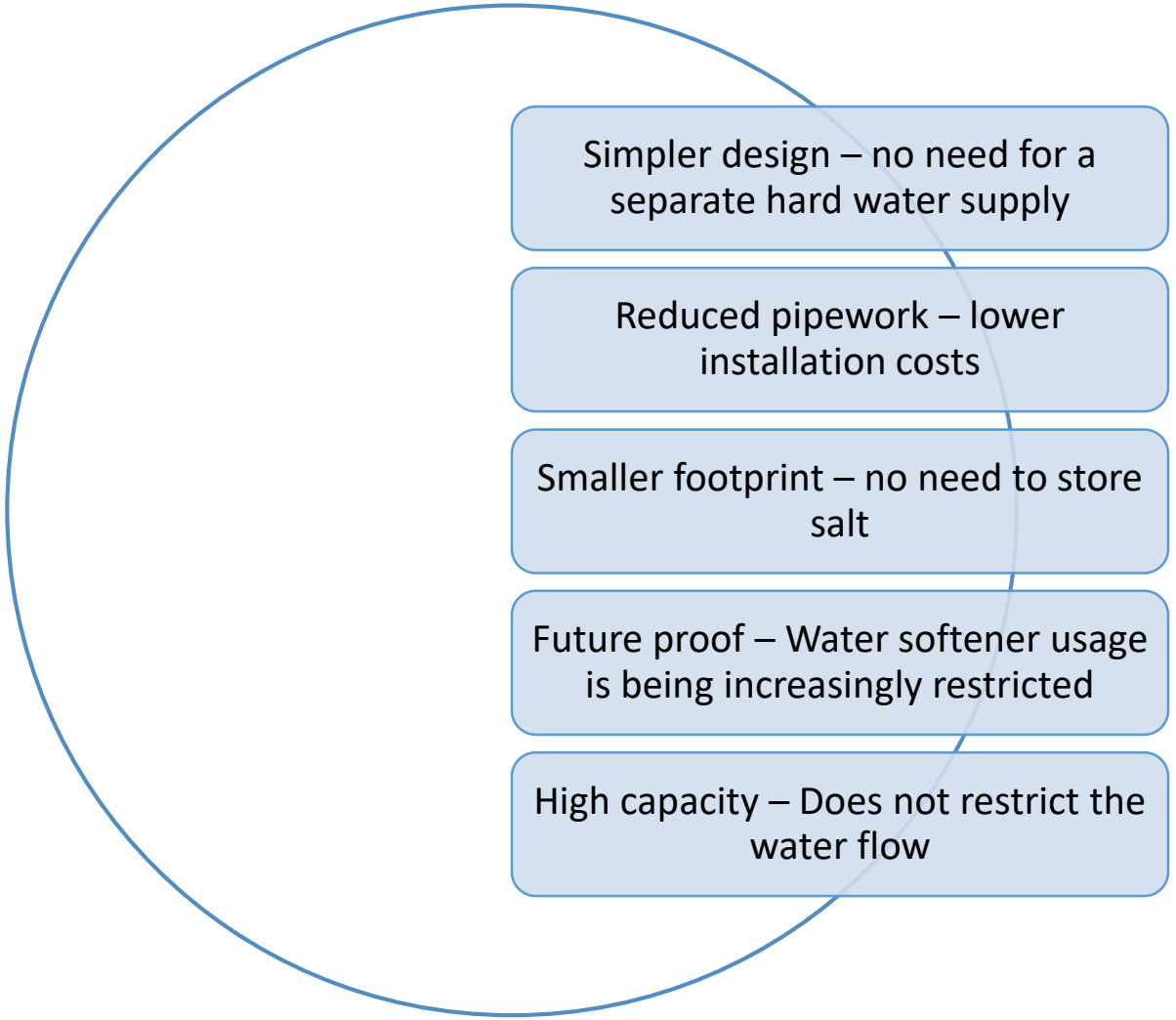
- ✓ This is not dependent on hardness or TDS (total dissolved solids)

TAC – How does it work?

- Technology introduced in 2004 – Relatively new to water treatment.
- A Reaction is carried out on a template – a honeycomb structure
- This produces well ordered micrometric and nanometric crystal structures
- Uses Polymeric Beads with nucleation sites to convert dissolved hardness into microscopic crystals
- Once crystals grow to the template size, the crystals are released and remain in the water without forming scale
- Operates as a fluidized bed to maximize surface area and effectiveness
- Commercially available for a variety of flowrates



Further Benefits



Who uses TAC?


A.O. Smith
Innovation has a name.
NORITZ
Rinnai
Marriott
Hilton
Holiday Inn Express
NHS
J·D·WETHERSPOON
ink!
COFFEE
CONCORDIA
BEVERAGE SYSTEMS
PIZZA EXPRESS
CROWNE PLAZA
HOTELS & RESORTS
Pizza Hut
TACO BELL
MACKENZIE HOTEL
GROUP
IBEROSTAR
HOTELS & RESORTS
Seattle's Best
Coffee
imo
Travelodge
LORENZETTI
Celestyal Cruises

Testimonial

Marriott International A&C Engineering Plumbing of the Marriott Hotel Design Standards....

"These Standards are provided to prospective owners and their design teams, and compliance with these Standards is required by contract. For example, the new 1400+ room Marriott Marquis at the Washington DC Convention Center (opened 2014) has a TAC system installed to condition the hot water there. In California where there are very strict sewer and water restrictions, **TAC is the only water-conditioning system that is acceptable to MI A&C Engineering. The TAC system is the perfect system for hotel applications, and it is strongly recommended by MI A&C Engineering here at Marriott HQ."**

LawrenceP. Frey , PE
Senior Corporate Director of Engineering
Marriott International A&C Engineering "

Thank you for your attention

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