



**DIGITAL HOT WATER SOLUTIONS**

# ARMSTRONG IS A TRUSTED GLOBAL LEADER IN INSTANTANEOUS HOT WATER GENERATION, DISTRIBUTION AND PRECISION TEMPERATURE CONTROL

With in-depth knowledge and experience that spans more than a century, Armstrong understands your hot water system dynamic in ways no one else can.

## DUTY OF CARE

Any building that is used by people other than the owner, the owner or manager has a legal responsibility placed upon them to ensure that others can use the building safely. Additionally, Building Services professionals have a “Duty of Care” to ensure that hot water generation and distribution systems are designed, installed, serviced and expertly maintained so that risks from scalding or bacterial infection are reduced and kept to an absolute minimum.

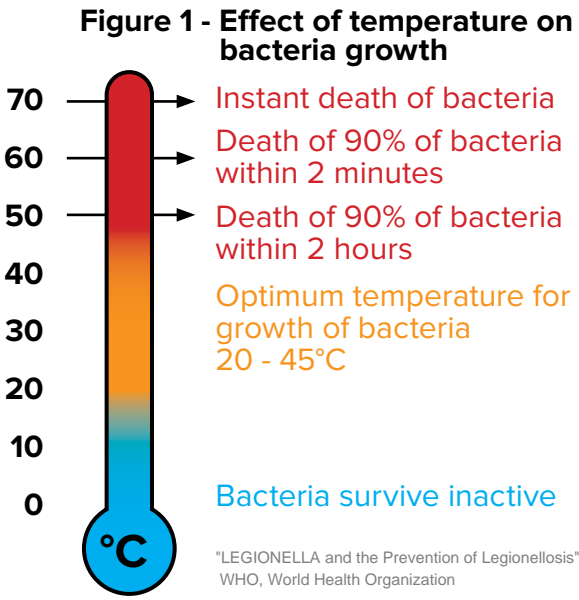
Despite this a significant number of building occupants are still injured or die every year because of these risks. Example : In August 2012, a tourist staying in an Edinburgh hotel (Scotland) was severely scalded whilst showering and died later in hospital after 6 weeks in intensive care. The hotel operator was recently forced to pay a six figure compensation to the family of the victim.

Chart 1 - Length of time for hot water to cause 3rd degree burns		
Temperature (°C)	Time (adult)	Time (child under 5)
38 °	cool bath	average bath
39 °	average bath	warm bath
50 °	9.5 minutes	4.5 minutes
52 °	2 minutes	1 minute
54 °	30 seconds	10 seconds
56 °	15 seconds	4 seconds
58 °	5 seconds	1 second
65 °	1.8 seconds	0.5 second

## MANAGING THE RISK

The major risks related to the provision of hot water in a building are the risk to users of scalding from too hot water and Legionnaires’ Disease. Both problems are linked as one directly affects the other.

The usual method for controlling Legionnaires’ Disease is to keep water hot. However, increasing hot water temperatures to kill bacteria brings an increased risk of scalding, which must also be controlled. You can see from the chart 1 and figure 1, that risk can be readily managed by ensuring the hot water delivered to bathrooms is no higher than 52°C. At this temperature Legionella bacteria cannot multiply, and will die over time, and a serious scald, even for a child, will take a submersion time of minutes rather than seconds to occur.



## LEGIONELLA GUIDELINE COMPLIANCE

There are a number of codes of practice and applicable guidelines for the control of Legionella, often with similar advice - that hot water should be stored at a temperature of at least 60°C and distributed at a minimum of 50°C.

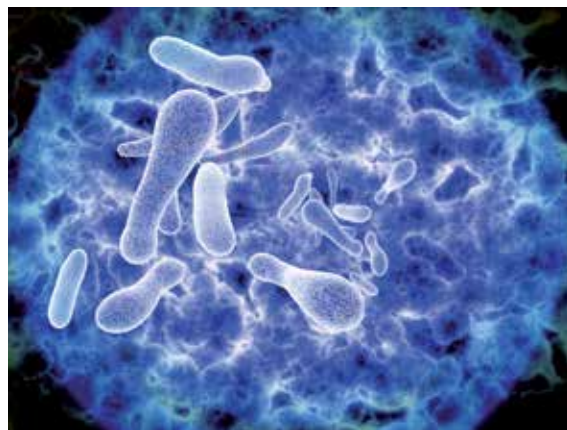
Examples of applicable guidelines:

- ASHRAE Guideline 12-2000
- ASHRAE Standard 188-2015 Legionellosis : Risk Management for Building Water Systems
- UK Health & Safety Executive HSG274 Part 2 : The Control of Legionella Bacteria in Hot and Cold Water Systems
- US Dept. of Labor – OSHA Technical Manual, Section III, Chapter 7, Legionnaires' Disease

As explained in HSG274 the risk of scalding at 50°C is low for most people so point of use thermostatic mixing valves, after an appropriate risk assessment, can be safely removed, if circulating the hot water at this temperature. For Elderly Care Homes and Healthcare facilities, it is recommended that the temperature out of the fixtures should be further reduced to 43/46°C, depending on the type of fixture.

Armstrong understands the Legionella Guidelines, and how to apply them, and we have the hardware to keep your hot water system compliant and the monitoring and recording software to prove it.

In the right conditions  
a few Legionella bacteria  
can grow from a few cells  
to a colony of millions  
within 8 - 10 days.



## YOUR ADVANTAGE

The ability to, very accurately, deliver tempered water at 52°C to the entire hot water network greatly reduces the risk of scalding from every fixture. This can remove the requirement for thermostatic mixing valves (TMV's). Eliminating TMV's from bathrooms reduces room entry necessary for maintenance, which, in the case of hotels can cause revenue loss, or in hospitals increase risk of bringing dirt and bacteria into the medical space. Even if the decision is to use a TMV's, by limiting the hot water temperature to the fixture, increased safety is guaranteed in the event of a TMV failure.

The advantage, to the owner, of eliminating or reducing the number of TMV's in the building, is that the cost of installing the hot water system is greatly reduced - often by around 50%.

Circulating the hot water around the building at 52°C, rather than 60°C, saves energy - by reducing the heat losses in the hot water loop and thus the cooling load on the building.

**ALL ADVANTAGES PROVIDED WITH THE INSTALLATION OF THE ARMSTRONG BRAIN® DIGITAL RECIRCULATING VALVE !**

# THE BRAIN® DIGITAL RECIRCULATING VALVE (DRV)

Armstrong introduced digital water temperature control to the world with The Brain® Digital Recirculating Valve (DRV). Engineered exclusively for recirculating hot water systems, The Brain® simplifies your hot water system to deliver unparalleled accuracy, stability and safety. It offers programmable temperature alerts and a program to promote compliance with recommended Legionella guidelines..

## FEATURES

- Designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system in a commercial building.
- Digital technology provides enhanced water temperature control accuracy regardless of whether a circulating system is simply idling or maximum draw-off is taking place.



### Performance

- +/- 1 °C control
- 0.5 °C minimum system temperature loss

### Smarts

- Component self-diagnostics
- Programmable set point & alerts
- Programmable Thermal disinfection

### Safety

- Over temperature shutoff
- Power failure shutoff
- Emergency mode

### Global Acceptance

- Marriott International has selected The Brain® as its corporate standard domestic hot water temperature control device for all new hotels.

### Connectivity

- Integral Modbus RTU interface (The Brain®)
- SAGE® - Building System interface module
  - Web Enabled
  - Modbus
  - BACnet™
  - LonWorks™



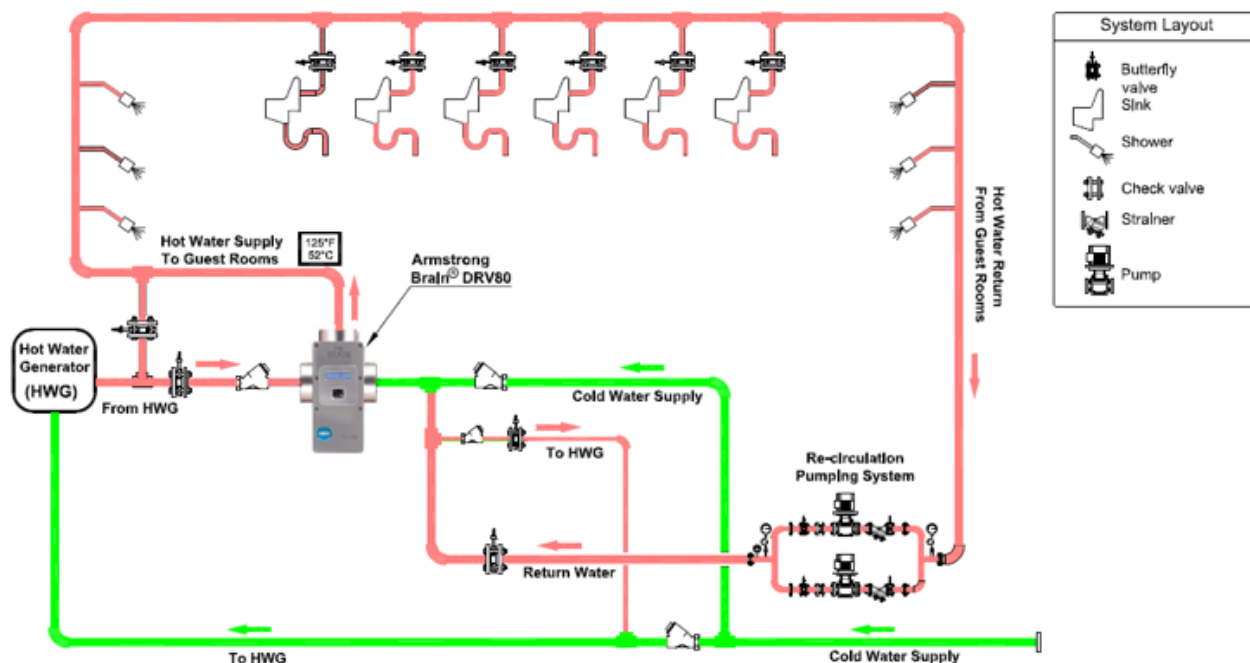
The Brain® can be installed as the final temperature control device before the hot water leaves the plant-room or be used to create control zones within the building to simplify balancing, improve circulation and easily manage a thermal disinfection regime. The Brain® is also a retrofit to existing problematic hot water systems.



## BUILT-IN HOT WATER SAFETY FROM THE START

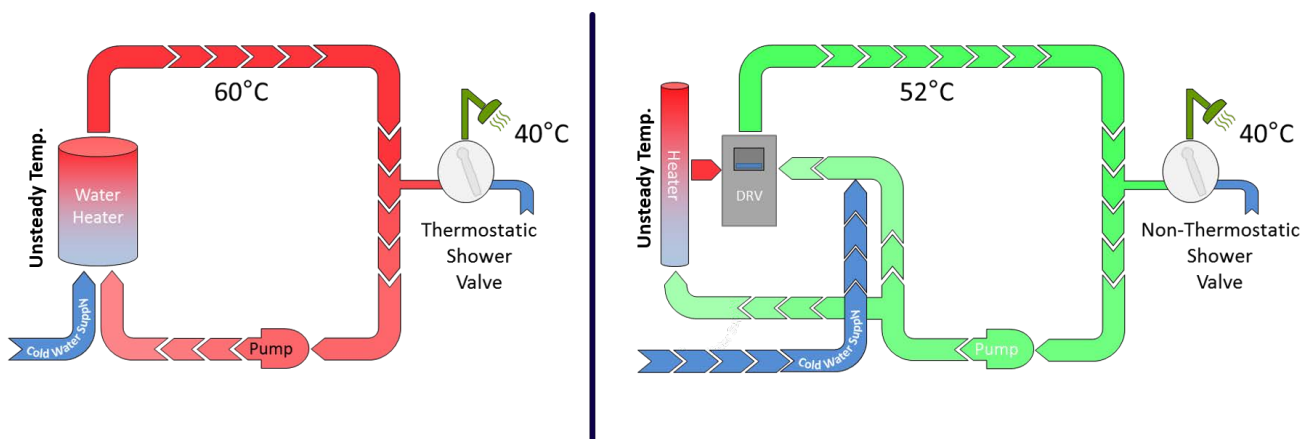
With integrated systems for generating hot water, as below, now common, maintaining accurate temperature control can often be difficult. The installation of the Brain<sup>®</sup> between the hot water generation plant and the user is an intelligent system operation protocol that will ensure the comfort and safety of users at all times and from every bathroom fixture.

The Brain<sup>®</sup> is designed to be the final temperature control device for any hot water generation system.



## DOMESTIC HOT WATER SYSTEM BALANCING

The improper balancing of hot water flow and return circuits can cause long lengths of stagnant water in the pipework. This increases Legionella growth risk and wastes utilities due to users having to wait for extended periods for hot water. Rather than controlling the circulation of the complete hot water system from the plantroom it is beneficial if the network is divided into manageable zones. A zoned hot water system will be simple to balance system; which will maintain accurate temperature control at all demand conditions, ensure good pipeline velocities around the whole circuit and make any thermal disinfection regime easy to manage. A Digital Recirculating Valve complete with its own dedicated hot water recirculating pump can be installed to control the hot water flow and return temperatures for each designated zone, which could be a single floor or a group of floors or risers.



## RELOCATE THE THERMAL BARRIER

Change the thermal barrier systems that protect the customer from scalding from the point of use to mechanical room and reduced cost of installation

# SMART SYSTEM MONITORING, THE BRAIN® AND SAGE®

SAGE® works seamlessly with The Brain® as it analyzes data to track behavior and performance as an integral component of a hot water system operation protocol which complies with a Standard of Care.

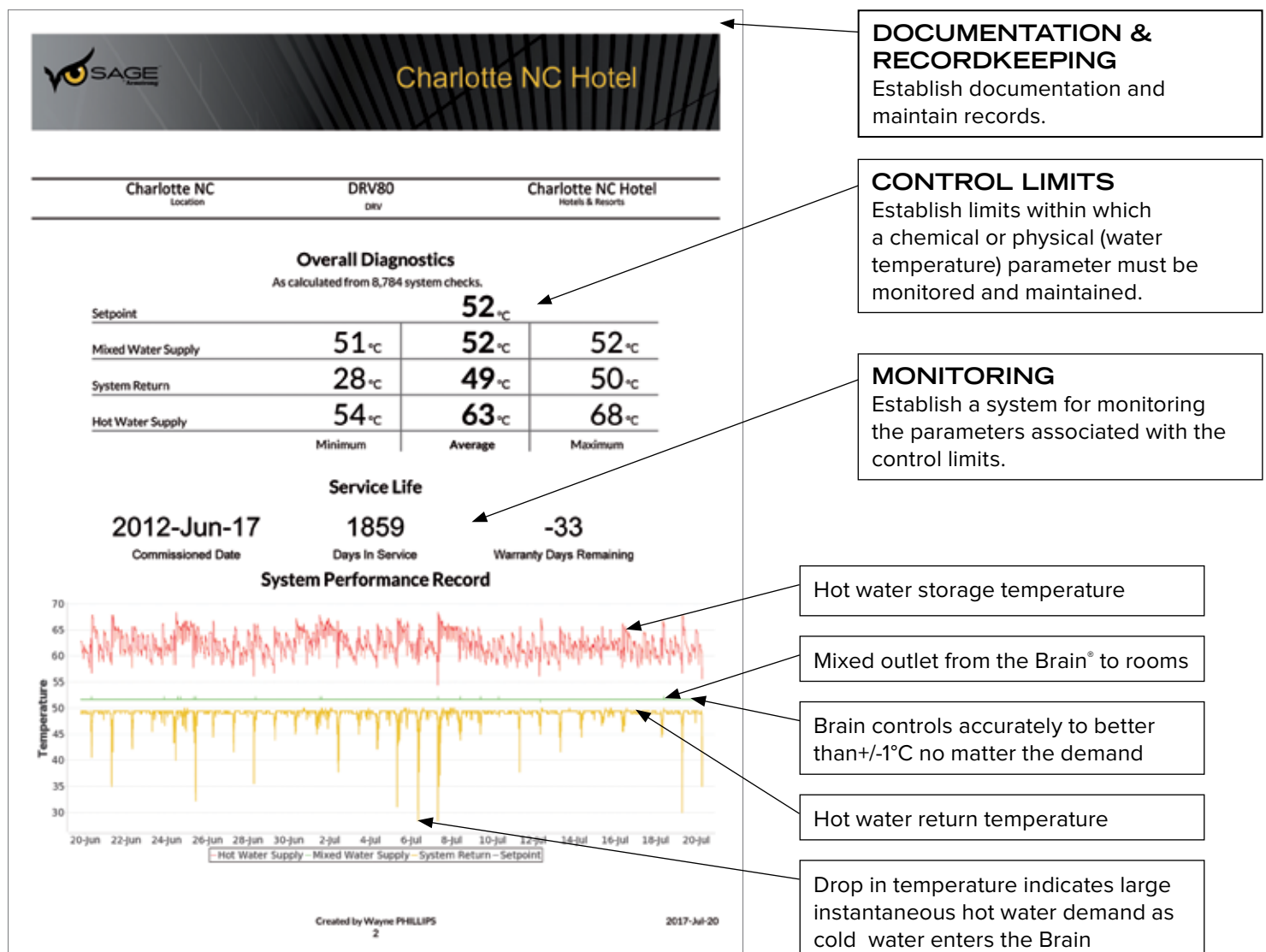
## FEATURES

Simple, effective monitoring, logging and remote alerting of key temperature control components of a hot water system safety risk management plan, for a modest monthly fee.

- **Dashboard Monitoring** – In real time.
- **Secure Remote Programming** – You are in control.
- **Multi-location View** – All properties simultaneously or filtered.
- **Temperature and System Diagnostic Alerts** – In real time.
- **Digital Documentation and Recordkeeping** – For as long as you want to retain it.

## BENEFITS

- **Safety** – Early warning system if hot water temperature do not meet specification. Patient/guest/student safety.
- **Compliance** – Track and document hot water system behavior and performance to ensure compliance with global hot water safety system guidelines implemented to reduce the risk of Legionella.
- **Performance** – SAGE® is programmed to track warranties, recommend/remind service intervals and communicate/suggest manufacturer recommended parts replacements provides hotel owner/operator room compensation protection.

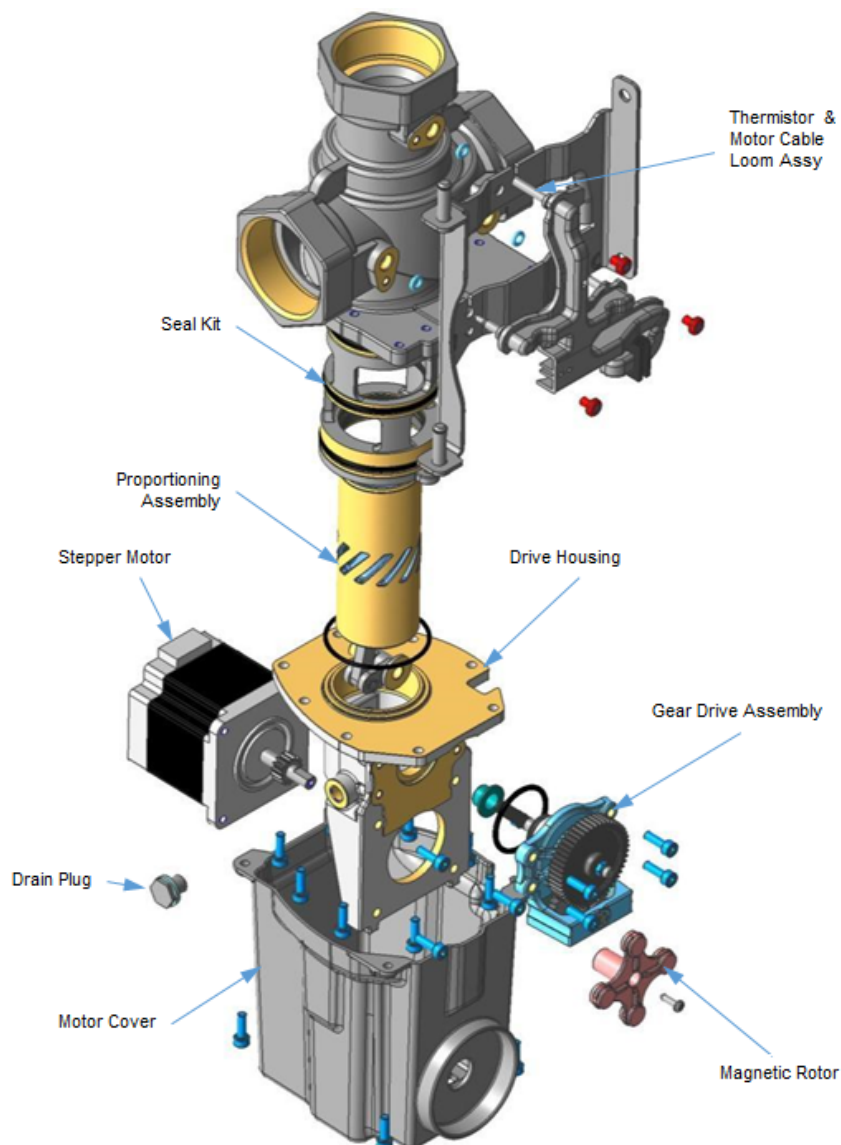


# THE BRAIN<sup>®</sup> - REFERENCES

The Brain are installed in many leading hotels in THAILAND. There are more to come!  
Many hotel choose The Brain to keep the "Safe Zone" of 52/50 °C. How about you?

## WE HAVE INSTALLED "DRV" FOR MANY TRUSTED INTERNATIONAL HOTELS IN THAILAND.

- **Hua Hin Marriott Resort & Spa**
- **Phuket Marriott Resort and Spa, Nai Yang Beach**
- **Bangkok Marriott Hotel The Surawongse**
- **Holiday Inn Resort Vana Nava Hua Hin**
- **Nikko Hotels Bangkok**
- **Hotel Verve Bangkok** (Grand Tower Inn Sukhumvit renovate)
- **InterContinental Phuket Resort, Kamala Beach**
- **Bangkok Hospital Ratchasima**
- **Bangkok Hospital Udonthani**
- **LDS Bangkok Thailand Temple**
- **Sindhorn Midtown**





INTELLIGENT SOLUTIONS IN STEAM, AIR, AND HOT WATER

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Europe / Middle East / Africa  
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