



## **SPECIFICATION GUIDELINE HOT WATER TEMPERATURE MAINTENANCE**

### **Tender Specification**

Package #: <INSERT>

Trace Heating

### **Engineering Specification for Single Pipe DHWS (Variable temperature Maintenance 50-65°C.)**

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# SPECIFICATION GUIDELINE

## HOT WATER TEMPERATURE MAINTENANCE

### S12 – Hot Water Services

#### Application: Domestic Hot Water Services (DHWS)

RAYCHEM - nVent RAYCHEM HWAT-R system complete with nVent RAYCHEM HWAT-Eco controller, nVent RAYCHEM SBS-xx-HV-ECO-10 control panel, or nVent RAYCHEM ACS-30 control & Monitoring system and RAYCHEM cold applied RayClic connection devices.

The RAYCHEM HWAT-R hot water temperature maintenance system will provide a constant maintenance temperature of 50-65°C across a single pipe hot water distribution system.

The Product shall be manufactured, supplied and delivered by:

nVent Ltd.  
3 Rutherford Road  
Stephenson Industrial Estate  
Washington, Tyne & Wear  
NE37 3HX  
Tel (UK): 0800 969 013  
Tel (Ireland) 1800 654 241  
E-mail (UK): [SalesThermalUK@nvent.com](mailto:SalesThermalUK@nvent.com)  
E-mail (Ireland): [SalesIE@nvent.com](mailto:SalesIE@nvent.com)

The heating cables shall be specifically designed for this application and shall comply with HSE HS (G) 70 as does the RAYCHEM Hot Water Maintenance System by nVent. The heating cables shall be capable of demonstrating a lifetime in excess of 40 years and have been used for this application for at least 20 years.

The heating cables and accessories shall be warranted for a minimum of 10 years, with the control devices being warranted for a minimum of 2 years. When installed by nVent or by a trained Certified Pro installer (named by the manufacturer), a 12 Year Warranty on heaters and accessories and 6 Years on controls is applicable.

The domestic hot water supply has been designed as a single pipe system. No return pipes shall be fitted.

All hot water service pipes shall be fitted with an energy efficient, self-regulating heating cable system, RAYCHEM HWAT-R, as manufactured by nVent, to compensate for heat losses and variably maintain pipe temperatures in the range 50-65°C.

The self-regulating heating cables shall have modified polyolefin electrical insulation (radiation cross-linked, to ensure long life expectancy), laminated aluminium foil layer (for increased chemical ingress protection), tinned-copper braid and modified polyolefin over-jacket with metre marks for ease of installation. The self-regulating index of the heating cable shall be at least 0.25. The cable shall also comply with EN62395-1.

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Interconnection and termination shall be with cold applied, insulation displacement connectors and gel type end seals, UV resistant, IP 68, 65°C rated, as manufactured by nVent and known as RayClic.

Control of HWAT circuits shall be via an energy saving, programmable controller to provide adjustable maintained temperatures in the range 50-65°C, as manufactured by nVent. The controller shall have a boiler temperature sensor (i.e. HWS flow temp) and alarm system, 7-day programmable temperature/time function, integrated clock, pre-set specific building programs, Legionella prevention cycle capability, password protection, optical and acoustic alarm fault messages. Acceptable control solutions include:

- **RAYCHEM HWAT-ECO** Controller
- **RAYCHEM SBS-xx-HV-ECO-10** Control Panel including electrical protection devices.
- **RAYCHEM ACS-30** Control & Monitoring system with centralized user interface and decentralised power and control modules.

The HWAT cables shall be installed 'straight traced'(i.e. not spirally wound), within their maximum circuit lengths, tested and commissioned strictly in accordance with the manufacturer's instructions, preferably by a specialist installer named by the manufacturer. The commissioning report must be registered to gain benefit from the product warranty. The system should be installed to within 1000mm of each outlet or blending valve, or as close as is reasonably practicable, and in accordance with hot water maintenance regulations.

Insulation selection and thickness shall be in strict accordance with the HWAT design guide, taking into account variations in ambient temperature, and must be applied without delay after the heating cable installation. Affix suitable "Electrically Traced" warning labels to the outer insulation, placed no less than 3m apart, on alternate sides of the pipe and visible from all sections.

All HWAT circuits shall be controlled and monitored via an approved control solution including integrated MCB's (BS EN 60898 type C or D) and RCD (30 mA sensitivity, tripping within 100 ms). All connections between the electrical supply, control panel and HWAT circuits shall be installed by an approved electrical contractor.

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### Control Systems

The Single Pipe DHWS (HWAT) system shall be controlled by either of the following control solutions, selected in function of the size of the DHWS distribution system:

- HWAT-ECO
- SBS-xx-HV-ECO-10 Control Panel
- ACS-30 Control and monitoring system

### HWAT-ECO Control Device

All HWAT circuits shall be controlled via an energy saving, programmable controller to provide an adjustable maintained temperature and known as RAYCHEM HWAT ECO, manufactured by nVent.

The controller shall have the following functions:

- Adjustable maintenance temperatures in the range 50-65°C
- Integrated power-off timer
- Boiler temperature (HWS flow temp) tracking
- Master/slave function for large hot water systems. One control unit (=Master) shall be programmable; the other control units (=slaves) shall automatically copy the master settings when connected to it. The master control unit shall have the facility to operate a further 8 slave units
- BMS connection via a variable DC voltage (0-10V).
- IP54 rated
- 9 editable built-in building specific programmes for temperature maintenance
- Automatic summer/winter time and leap year correction programming
- Visible and audible alarm

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### SBS-xx-HV-ECO-10 Control Panel

All hot water temperature maintenance trace-heating circuits shall be controlled and monitored via an integrated electrically protected, multi circuit control panel, SBS-xx-HV-ECO-10, by nVent.

The HWAT panel shall provide control and monitoring functionality for a multiple circuit single pipe hot water temperature maintenance system including the provision of all electrical and circuit protection devices for safety purposes. The electrical panel shall be approved for use with the HWAT system and be certified for use by nVent.

The control panel shall be available, as standard, in the following variants:

SBS-03-HV-ECO-10 (Control & monitoring for up to 3 circuits)

SBS-06-HV-ECO-10 (Control & monitoring for up to 6 circuits)

SBS-09-HV-ECO-10 (Control & monitoring for up to 9 circuits)

The panel shall comprise an integrated power load management algorithm to avoid peak power loading.

The control and monitoring panel shall have, as a minimum:

EN60204-1 and EN60439-1 compliance, CE approved for use with heat tracing systems.

RAL7035 (Light Grey) Coated Metal Housing – IP54 rated.

A volt free alarm contact to indicate:

- RCD or circuit breaker failure mode
- Loss of power indicator
- Controller or sensor error detection mode

A phased switch-on to allow peak load management. The phased switching should be managed by an integrated time-shift duty-cycle control method.

An HWAT-ECO control unit as the central control device for standard heating and economy set-back mode programmable functions.

Type C circuit protection and residual current device (30 mA rated) per heating circuit.

Mounted terminal blocks for easy connection of the heating circuits within the panel.

An integrated boiler output temperature sensor for HWS flow temperature tracking capability.

All electrical connections between the electrical supply, control panel, and the heating circuits shall be carried out by an approved electrical contractor.

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### ACS-30 Control & Monitoring System

All heat-tracing circuits shall be controlled and monitored via an electrically protected, multi circuit control solution, with an integrated centralised user interface terminal (UIT), known as RAYCHEM ACS-30, from by nVent. The UIT shall include 3 customisable alarm outputs for customer specification.

The control & monitoring (C&M) system shall provide control and monitoring functionality for a multiple circuit heat-tracing system including the provision of all electrical and circuit protection devices. The Control system shall be certified and approved by the manufacturer for use with the heat-tracing system. The C&M system shall be modular for easy design and shall comprise some or all of the following product modules:

**nVent RAYCHEM ACS-30-EU-UIT2** Touch screen colour user interface terminal for control and monitoring of up to 260 individual circuits (Always included in the system).

**nVent RAYCHEM ACS-30-EU-PCM2** power & control modules which include integrated control & monitoring capability and electrical safety for equipment personnel and circuit protection switchgear. The power & control module will also include 5, 10, or 15 heating circuit capability, dependent upon selection, and will include an input (temperature sensor or external device) per circuit for individual heater circuit temperature monitoring (At least one PCM shall be included in the system).

**nVent RAYCHEM ACS-30-EU-Moni-RMM2-E** remote monitoring module for the addition of 8 resistance temperature detectors (RTDs) for connection to the ACS-30-EU-PCM or to the - ACS-30-EU-UIT2. Up to 16 RMM modules may be controlled via a single User interface Terminal (UIT).

The control system shall be capable of controlling and monitoring up to 260 individual circuits of heat-tracing via a centralised user interface terminal (UIT) for easy system monitoring.

The heating circuit power and control modules (PCM) shall be modular, decentralised solutions to enable placement throughout the building, or group of buildings, in proximity to the required heating system to limit the quantity of power cabling.

The PCMs shall be connected to the UIT via RS-485 cable for communication, control & monitoring purposes. In the event of power failure or communication failure from the UIT, the PCM shall be capable of continued function for safety and system continuity.

The C&M system shall be capable of monitoring circuit by circuit line or ambient temperature, energy consumption, energy usage pattern, and ground fault/earth fault detection. There shall be an alarm function on a circuit by circuit basis. In the event of an alarm, the UIT shall provide details of the alarm reason as well as indicating the specific circuit(s) affected, with the event captured automatically in the event log in the UIT.

The control system shall be compliant with European norm EN60439-1 and be tested and CE approved to this standard.

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All UIT and PCM units shall be RAL7035 (light grey) coloured metal enclosures for hard wearing durability. Type C circuit protection and residual current device (30mA rated) shall be included in the PCM per heating circuit. All electrical connections between the electrical supply, UIT, power & control modules, ancillaries, and heating circuits shall be carried out by a qualified and approved electrical contractor.

### **In Engineering Notes Column**

The domestic hot water supply has been designed as a single pipe DHWS. No return pipes shall be fitted in order to minimise heat loss and improve energy efficiency.

All hot water service pipes shall be fitted with the energy efficient, self-regulating heating cables, RAYCHEM HWAT-R, as manufactured by nVent to maintain an adjustable temperature in the range 50-65°C.

Termination of the self-regulating heating cables shall be with insulation displacement type connectors and gel type end seals, Rayclac, as manufactured by nVent.

The circuits shall be controlled via an energy saving, programmable controller, HWAT ECO\*, SBS-xx-HV-ECO-10\*, or ACS-30\* (\*delete as appropriate), as manufactured by nVent, to provide adjustable temperatures in the range 50-65°C.

The HWAT cables shall be installed 'straight traced' (i.e. not spirally wound), insulated, tested and commissioned strictly in accordance with the HWAT design guide and preferably by nVent or a specialist installer named by them.

The cables shall be installed to within 1000mm of each outlet or blending valve, or as close to the draw-off point as is reasonably practicable.

Insulation selection and thickness shall be in strict accordance with the HWAT design guide.

**SPECIFICATION GUIDELINE  
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**Appendix A.**



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