Heat losses in W/m, pipe 55°C in 18°C ambient.

15 mm

20 mm

25 mm

30 mm

50 mm

60 mm

65 mm

80 mm

100 mm

G

Table 2 Insulation

es in W/m, pipe 55°C in 18°C ambient.										Heat losses in W/m, pipe 55°C in 5°C ambient												
	DN 15	<b>DN</b> 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	<b>DN</b> 100	DN 125		Insulation	DN 15	DN 20	DN 25	DN 32	DN 40	<b>DN</b> 50	DN 65	DN 80	<b>DN</b> 100	DN 125
	10	12	14	16	18	21	25	29	36	43		15 mm	13	16	18	21	24	28	34	38	47	56
	9	10	12	14	15	18	21	24	29	35		20 mm	12	13	16	18	20	23	28	32	39	46
	8	9	10	12	13	15	18	21	25	30		25 mm	10	12	14	16	17	20	24	27	33	39
	7	8	9	11	12	14	16	18	22	26		30 mm	10	11	12	14	16	18	21	24	29	34
	6	7	8	9	10	12	14	15	18	21		40 mm	8	10	11	12	13	15	18	20	24	28
	6	7	7	8	9	10	12	13	16	18		50 mm	8	9	10	11	12	13	16	17	21	24
	5	6	7	8	8	9	11	12	14	16		60 mm	7	8		10	11	12	14	15	18	21
	5	6	6	7	8	9	10	11	13	15		65 mm	7	8	9	10	10	12	13	15	17	20
	5	5	6	7	7	8	9	10	12	13		80 mm	6	7	8	9	9	10	12	13	15	17
	4	5	5	6	6	7	8	9	10	11		100 mm	6	6	7	8	8	9	11	11	13	15

not recommended recommended possible

not recommended recommended possible

Ambient temperature: 18°C

Thermal conductivity  $\lambda = 0.035 \text{ W/m*K}$ 

For other thermal conductivity insulation materials, contact your Pentair representative.

Table 3 Maximum Circuit Length Maximum Allowable Circuit Length [m]

assumes minimum start-up temperature of +12°C, 230VAC								
Circuit Breaker Size [Amps]	Maximum Circuit Length [m]							
10	50							
13	65 80 100							
16								
20								

#### SINGLE PIPE HOT WATER TEMPERATURE MAINTENANCE SPECIFICATION

The domestic hot water supply has been designed as a single pipe system, no return pipes or recirculation pumps shall be fitted and no hydraulic balancing is required. To compensate for heat losses and to maintain pipe temperatures, all hot water supply pipes shall be fitted with an energy efficient self-regulating heating cable system, known as Raychem HWAT, manufactured by Pentair.

The system shall be complete with self-regulating temperature maintenance cables, advanced energy efficient controller and cold applied components for interconnection and

The temperature maintenance cables, controls and system components shall be CE marked and certified according to EN codes by BSI, VDE, CSTB, SEV, ÖVE and fulfil the hygiene requirements of DGVW and SVGW.

The manufacturer shall offer an extended warranty of 10 years for temperature maintenance cables and own standard components and 2 years for controllers, subject to the system being designed, installed, tested and commissioned strictly to their requirements. The warranty shall be extended to 12 years on temperature maintenance cables/own components and 6 years on controls when installed by the manufacturer or by a trained installer recognised by them. All subject to the completion of the online

Document submittal shall include: data sheets (for temperature maintenance cables, components and controller), system design guide, typical system schematic drawings, controller wiring diagrams, installation and operation manual.

# SELF-REGULATING TEMPERATURE MAINTENANCE CABLES

The self-regulating temperature maintenance cables shall be specifically designed for this application, tested and approved to IEC 62395 and IEEE 515.1; suitable for use with 20A circuit breakers; minimum bend radius less than or equal to 10mm; qualified and tested to demonstrate a useful lifetime in excess of 40 years.

The construction of the self-regulating temperature maintenance cable shall include a conductive polymer core, modified polyolefin electrical insulation (radiation cross-linked to ensure long life expectancy), laminated aluminium foil layer, tinned copper braid (minimum 70% coverage) and modified polyolefin over jacket. HWAT R to provide pipe maintained temperatures in the range 50-65°C

# INTERCONNECTION AND TERMINATION COMPONENTS

Interconnection and termination shall be with cold applied insulation displacement connectors and gel type end seals that are UV resistant, IP68/65°C rated, suitable for 2500Vdc insulation resistance test; with Torx head fittings for quality of closure and both audible & visual installation confirmation, known as RayClic, manufactured by Pentair.

#### THERMAL INSULATION

Insulation selection and thickness shall be strictly in accordance with the self-regulating temperature maintenance cable system design guide.

#### ENERGY EFFICIENT, CONTROL SYSTEM: SINGLE CIRCUIT, SINGLE APPLICATION CONTROLLER

All hot water temperature maintenance circuits shall be controlled using a programmable, energy saving, single circuit local controller to provide adjustable maintained temperatures in the range 50-65°C, water heater sensor and alarm, integrated power off timer function with 7 day programmable capability, 0-10V DC input to allow BMS temperature change. The system shall be HWAT ECO, as manufactured by Pentair.

The self-regulating temperature maintenance cables shall be installed in accordance with the design plans, 'straight traced' within the manufacturers defined maximum circuit lengths, tested and commissioned strictly in accordance with the manufacturer's instructions. Installation of thermal insulation shall be closely coordinated with the responsible sub-contractors.

### **ELECTRICAL CONNECTION**

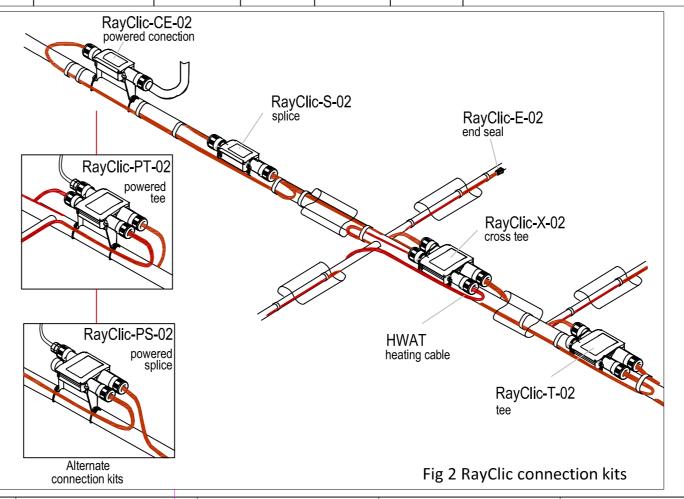
All connections between the electrical supply, control panel and self-regulating temperature maintenance cable circuits shall be installed by an approved electrical contractor and protected by MCB (BS EN 60898 type C or D) and RCD (30 mA sensitivity, tripping within 100ms).

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## Table 4 HWAT-R Domestic Hot Water Heating Cable System Schedule

Table 4 TWAT-N Domestic Not Water Heating Cable System Schedule									
Circuit Number	PC Location	Operating Temperature [°C]	Estimated Length [m]	Circuit Breaker [A]	Max. CT. Length [m]	Notes			
1	Outside Room XXX	60	XXX	20	100	Serving Kitchen Tee located in hallway			
2	Outside Room XXX	55	XXX	20	100	Serving A wing 1st floor end at sink B3			
3	Outside Room XXX	55	XXX	20	100	Serving A wing 1st floor			
4	Outside Room XXX	55	XXX	20	100	Serving A wing 1st floor			
5	XXX	XXX	XXX	20	100	SPARE			



1. All dimensions to be checked on site 2. For HWAT installation instructions please consult installation manual IM-INST293 3. For HWAT ECO installation instructions please consult manual IM-INST189 4. For Rayclic installation instructions please consult manual IM-INST168 REFERENCE DRAWINGS ISSUED FOR SAMPLE PURPOSES ONLY 00 25/04/2016 MG MG REV CAD DES CHK APP DATE DESCRIPTION PENTAIR THERMAL BUILDING SOLUTIONS PENTAIR thermal.info@pentair.com © 2016 PENTAIR TYPICAL SCHEMATIC LAYOUT HWAT with HWAT ECO Controller Heating Cable System Layout en CLIENT DOCUMENT CODE CLIENT DRAWING NO NTS PTM PROJECT NO. PTM DRAWING NO.

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FILENAME: HWAT System w ECO with Spec Notes\_0416\_REV\_00.DWG

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