

RMPG19 – Water Safety Management Procedure - Appendix 5

ENGINEERING CONTINGENCY MEASURES: TEMPERATURES HIGHER THAN RECOMMENDED CWS TEMPERATURES

Results Interpretation and Specific Action Required: The information below is meant to indicate some possible causes and suitable remedial action and shall not be considered exhaustive. Each failure must be considered in detail and the causes suitably addressed.

Result	Possible cause	Remedial Action
Mains >20°C	1. High ambient temperatures	<ul style="list-style-type: none"> • Consider on-line disinfectant to negate temperature control as primary bacterial control method. • Increase water through-put by strategic flushing to reduce water retention time. • Carry out biological sampling to ascertain effect of increased CWS temperatures. • When temperature exceeds 20°C persistently; increase frequency of biological sampling to MONTHLY to ascertain effect of increased CWS temperatures.
Tank temperature greater than mains temperature	1. Tank over capacity	<ul style="list-style-type: none"> • Reduce stored water capacity to reduce water retention time. • Increase water through-put by strategic flushing to reduce water retention time. • Carry out biological sampling to ascertain effect of increased CWS temperatures.
	2. Lack of adequate tank insulation	<ul style="list-style-type: none"> • Install or improve tank insulation
	3. High tank room temperatures	<ul style="list-style-type: none"> • Increase tank room ventilation
Outlet temperatures greater than mains/tank temperatures	1. Areas of “low-flow” or dead-legs in the system and lack of adequate use causing stagnation	<ul style="list-style-type: none"> • Increase water through-put by strategic flushing to reduce water retention time. • Carry out biological sampling to ascertain effect of increased CWS temperatures.
	2. Lack of adequate tank insulation	<ul style="list-style-type: none"> • Install or improve tank insulation
	3. Heating pipes in close proximity to CWS pipes	<ul style="list-style-type: none"> • Increase insulation • Consider relocation of CWS/heating pipes if practicable. • Consider on-line disinfectant to negate temperature control as primary bacterial control method. • Carry out biological sampling to ascertain effect of increased CWS temperatures.

NOTE: Ensure that all temperature measuring instruments including: thermometers; gauges and BMS Temperature monitoring points are adequately calibrated.

LOWER THAN RECOMMENDED CWS TEMPERATURES

Results Interpretation and Specific Action Required: The information below is meant to indicate some possible causes and suitable remedial action and shall not be considered exhaustive. Each failure must be considered in detail and the causes suitably addressed.

Result	Possible cause	Remedial Action
Stored and/or Flow temperatures <60°C	1. Low "Set" temperatures for hot water generation of <60°C	<ul style="list-style-type: none"> • Increase temperature to ≥60°C. • If temperature <50°C, carry-out pasteurisation of vessel. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	2. Thermostat failure	<ul style="list-style-type: none"> • Replace thermostat. • Carry-out pasteurisation of vessel before use. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	3. Primary heating supply isolated	<ul style="list-style-type: none"> • Employ heating supply. • Carry-out pasteurisation of vessel before use. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	4. Primary heating failure	<ul style="list-style-type: none"> • Repair primary heating supply. • Carry-out pasteurisation of vessel before use. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	5. Generation units under-rating/under capacity	<ul style="list-style-type: none"> • Consider capacity vs demand and replace unit with more suitably sized vessel. • Carry-out pasteurisation of replacement vessel prior to being put into service.
	6. Temperature taken with contact probe	<ul style="list-style-type: none"> • Obtain 'direct' temperature, using calibrated thermometer, from ideally located sampling point and reconsider results.
	7. Gauges and/or BMS temperature monitoring points not calibrated	<ul style="list-style-type: none"> • Calibrate all gauges and/or BMS monitoring points and reconsider results.
Return temperature <55°C when Flow temperature >60°C	1. Distribution system short circuiting	<ul style="list-style-type: none"> • Carry out investigation of distribution pipe-work to locate possible short-circuit.
	2. Circulation pump under rated	<ul style="list-style-type: none"> • Upgrade circulation pump to a suitable rating. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.

Return temperature <55°C when Flow temperature >60°C (cont.)	3. Circulation pump faulty	<ul style="list-style-type: none"> • Replace/repair circulation pump.
	4. Temperature measurement taken down stream of cold supply	<ul style="list-style-type: none"> • Re-measure temperature from location upstream of cold supply.
	5. Temperature taken with contact probe	<ul style="list-style-type: none"> • Obtain 'direct' temperature, using calibrated thermometer, from ideally located sampling point and reconsider results.
	6. Gauges and/or BMS temperature monitoring points not calibrated	<ul style="list-style-type: none"> • Calibrate all gauges and/or BMS monitoring points and reconsider results.
Distribution temperatures <50°C when Flow temperature >60°C	1. Excessive heat loss.	<ul style="list-style-type: none"> • Inspect HWS and CWS insulation and upgrade where practicable. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	2. "non-returned" pipe spurs	<ul style="list-style-type: none"> • Inspect the length of non-returned spurs and rectify by relocating HWS Return to within 300mm of point of delivery if practicable
	3. Areas of "low-flow" or dead-legs in the system	<ul style="list-style-type: none"> • Increase water through-put by strategic flushing to reduce water retention time. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	4. Presence of space-heating apparatus on the HWS system	<ul style="list-style-type: none"> • Investigate the presence of heat loss due the presence of space heating (towel rails, linen cupboard heaters, etc.) and remove from the system. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.
	5. Failure of Trace Heating system or Trace Heating system not extending to extremities of the system.	<ul style="list-style-type: none"> • Inspect the Trace heating system and repair/replace if necessary or extend system to allow for temperature maintenance to system spurs. • Carry out biological sampling to ascertain effect of decreased HWS temperatures.