

# Level 3 Technical Certificate in Water Treatment and Legionella Management

## WTT 2.01 Advanced Water Chemistry and Associated Problems

### Water sources:

- Water cycle
- The different types of water extraction
- What affects the quality of a water source

### Scale:

- Types of hardness salts
- How scale formation occurs
- Comparison of different scale types

### Corrosion:

- Types of corrosion
- What causes corrosion
- Galvanic table
- How corrosion occurs

### Microbiology:

- What organisms live in water
- Cell structure
- Habitat and nutrient requirements
- Biofilm production

### Water quality measurement:

- The relationship between pH, acidity and alkalinity
- Hardness and alkalinity
- Stability indices
- Types of dipslide available

### Problems associated with water systems:

- Types of water system
- Materials of construction
- Problems associated with corrosion and scale
- Microbiological and other fouling

## Course Content

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## WTT4.01 Advanced Chemical & Physical Water Treatment

### Scale inhibition:

- Water softeners and Reverse Osmosis
- Other mechanical methods of scale inhibition
- Actions of chemical scale inhibition
- Types of chemical used for inhibition

### Corrosion inhibition:

- Oxygen removal
- Actions of chemical inhibitors
- Galvanic table
- Other inhibition methods

### Biofouling inhibition:

- Environmental factors in microbiological control
- Types of biocide and mode of action
- Alternation of biocides
- Biofilm control
- Other methods of microbiological control

### Suspended solids

- Types of suspended solids
- Chemical cleaning operations
- Flushing, chemicals and flow rate
- Types of filtration

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## WTT 6.01 Advanced Water Testing

### Sampling:

- Correct identification of sampling points
- Impact of environmental and system conditions
- Types of sampling equipment
- Sampling Standards and Regulations
- Laboratory testing

### Tests:

- Types of pH, conductivity and temperature meters
- Types of chemical testing equipment
- Types of dipslides and their culture
- Laboratory sampling
- Corrosion monitoring

### Routine testing

- Types of tests
- Importance of certain tests
- Value of the results
- Analysis of dipslide results

### Calibration:

- Shelf life of reagents
- The importance of regular calibration
- Calibration of pH meter, conductivity meter and thermometers

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## WTT 8.01 Advanced Treatment of Domestic Hot & Cold Systems

### Problems:

- Types of system
- Design problems
- The use of saturation indices
- Problems caused by scale
- Problems caused by corrosion
- Problems caused by bio fouling
- Importance of temperature control

### Treatment:

- Legionella risk assessments
- Types of chemical treatment
- Types of physical treatment
- Temperature as a control method
- Regulations, standards and guidance

### Treatment Application:

- Chemical dosing methods
- Potential dosing points in a system
- Chemical tests used
- Chemical treatment parameters

### Monitoring:

- Water quality parameters for hot and cold systems
- Sampling programmes
- Test equipment used
- Sampling equipment used
- Laboratory testing completed

### Cleaning and disinfection:

- What problems occur and how they evolve
- Frequency of cleaning operations
- Types of chemical used for disinfection
- Monitoring of a cleaning and disinfection procedure
- Health & Safety aspects

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## WTT 10.01 Advanced Treatment of Closed Water Systems

### Problems:

- Types of closed systems
- Common design problems
- Problems caused by scale
- Problems caused by corrosion
- Problems caused by bio fouling
- Problems caused by suspended solids

### Treatment:

- Types of chemical treatment
- Types of physical treatment
- Guidelines, standards and regulations

### Treatment Application:

- Chemical dosing methods
- Chemical dosing points
- Chemical treatment calculation
- Specific system chemical treatment parameters

### Monitoring:

- Control tests for closed water systems
- Test equipment and tests used
- Sampling equipment used
- Laboratory testing completed
- Corrosion monitoring

### Cleaning and Flushing:

- How problems evolve
- When is cleaning and/or flushing required
- Flow rates during the flushing process
- Chemical treatments that can be used
- Monitoring of cleaning and flushing procedures
- Filtration methods that can be used

## Course Content

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## WTT 12.01 Advanced Treatment of Evaporative Cooling Systems

### Problems:

- Types and design of Evaporative Cooling Systems
- Common design problems
- Problems caused by scale
- Problems caused by corrosion
- Problems caused by bio fouling
- Problems caused by suspended solids

### Treatment:

- Legionella risk assessment
- Types of chemical treatment
- Types of physical treatment
- Evaporation, bleed and make up
- Solubility indices
- Guidelines, guidance, standards and regulations

### Treatment Application:

- Controlling system concentration
- Chemical dosing methods
- Chemical treatment dose rate calculation
- Specific system chemical treatment parameters

### Monitoring:

- Control tests for Evaporative Cooling Systems
- Chemical parameters
- Test equipment and tests used
- Sampling equipment used
- Laboratory testing completed
- Corrosion monitoring

### Cleaning and Flushing:

- How problems evolve
- When is cleaning and disinfection required
- Water distribution during the cleaning and disinfection process

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## WTT 14.01 Advanced Treatment of Steam Generation Plant

### Problems:

- Types and design of Steam Generation Plant
- Hotwell/feed tank designs and problems
- Economisers/dearators and condensate return
- Problems caused by scale
- Problems caused by corrosion
- Problems caused by priming and foaming
- Common problems associated with plant design

### Treatment:

- The importance of feed water temperature and oxygen
- Types of chemical treatment
- Types of physical treatment
- Treatment of condensate lines
- Blowdown, steam and feed calculations
- Heat and energy recovery
- Guidelines, guidance, standards and regulations

### Treatment Application:

- Controlling boiler concentration
- Chemical dosing methods and application points
- Chemical treatment dose rate calculation
- Specific system chemical treatment parameters

### Monitoring:

- Control tests for Steam Generation Plant
- Chemical parameters
- Test equipment and tests available
- Sampling equipment used
- Condensate monitoring

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## WTT 16.01 Legionella Risk Assessment

### The 5 Steps of Risk Assessment:

- What represents a potential risk
- Who is at risk
- How to evaluate a risk
- The general outline of a risk assessment report
- When to review a Risk Assessment

### Completing a Risk Assessment:

- What is a Risk Assessment and who is competent to complete one
- What resources may be required and access limitations
- Sampling requirements and their completion
- Reviewing available data and its value
- Assessing training and competence
- Communicating matters of concern

### Schematic Drawings:

- Detail required
- The system elements that should be identified
- The system fittings that should be identified
- Types and output formats for Schematic Drawings
- Competence required to complete Schematic Drawings

### Risk Assessment Outputs

- Regulations and guidance
- Evaluation of risk
- Prioritisation of actions
- The Management Scheme and Control Measures
- Site and system responsibilities

### Risk Assessment Reviews:

- When is a review required
- What should be reviewed
- Under what circumstances is a review not sufficient
- Maintenance, monitoring and inspection records and systems

## Course Content