

| Underpinning Knowledge                                     | Pre-Commission Cleaning | Remedial Cleaning | Maintenance Water Treatment |
|--|-------------------------|-------------------|-----------------------------|
| Basic water chemistry                                      | Y                       | Y                 | Y                           |
| Types and operation of closed systems                      | Y                       | Y                 | Y                           |
| HS&E   | Y                       | Y                 | Y                           |
| Basic Microbiology   | Y                       | Y                 | Y                           |
| Basic understanding of closed systems and components       | Y                       | Y                 | Y                           |
| Flow measurement   | Y                       | Y                 | N                           |
| Pump speed control   | Y                       | Y                 | N                           |
| System pressurisation                                      | Y                       | Y                 | N                           |
| Types of control valve                                     | Y                       | Y                 | N                           |
| Types of differential pressure control                     | Y                       | Y                 | N                           |
| <b>Advanced knowledge</b>                                  |                         |                   |                             |
| Interpretation of water chemistry                          | Y                       | Y                 | Y                           |
| Cleaning process selection                                 | Y                       | Y                 | N                           |
| Water treatment programming                                | N                       | N                 | Y                           |
| Impact of Flow rate  | Y                       | Y                 | N                           |
| Interpretation of Microbiology results                     | Y                       | Y                 | Y                           |
| Good understanding of closed systems, plant and components | Y                       | Y                 | Y                           |
| Batch flushing principles                                  | Y                       | Y                 | N                           |
| <b>Underpinning Skills</b>                                 |                         |                   |                             |
| Sampling   | Y                       | Y                 | Y                           |
| Use of test kits   | Y                       | Y                 | Y                           |
| Dosing systems   | Y                       | Y                 | Y                           |
| <b>Advanced Skills</b>                                     |                         |                   |                             |
| Supervising a team   | Y                       | Y                 | N                           |
| Planning a water quality maintenance regime                | N                       | N                 | Y                           |
| Planning a cleaning process                                | Y                       | Y                 | N                           |