Wastewater Treatment Technician

Unit WWTTO04 Operate and Maintain Anaerobic Digestion

This training specification has been developed from the water process trailblazer standard. The specification details the **minimum** training specification, as agreed by industry employers, to deliver the skills and knowledge required to operate and maintain the process of anaerobic digestion.

The specification details the critical requirement of the activity to carry out the work outlined and does not preclude employers from adding to the skills and knowledge detailed by the specification in their own training programmes.

All work must be carried out to approved procedures and practices and in accordance with statutory health, safety and environmental requirements.

What does this specification look like?

Wastewater treatment technicians need to be able to:

AD1 Control the anaerobic digestion processes on wastewater treatment works

AD2 Optimise anaerobic digestion processes on the basis of process performance, test results, analysis of trends and legislative requirements

AD3 Restore anaerobic digestion processes to normal operation through identification of root cause of faults arising with the processes

What do I need to take this module?

Candidates to be **assessed** as competent in this area should have successfully completed the modules shown below or have evidence demonstrating an equivalent level of competence.

1. SHEA or equivalent
2. Sludge storage, treatment and transportation
3. Odour Management
4. Wastewater compliance and performance monitoring

Performance Criteria

To achieve this unit, you will need to be able to:

General Requirements

P1. Identify the work area to be accessed using company documentation, systems and work instructions
P2. Select, inspect and wear required PPE in line with company procedures
P3. Carry out a site specific risk assessment of the work area, identifying the hazards and implementing the control measures required
P4. Maintain accurate and up to date records
P5. Report information and data to the designated person

Task Specific – Operate and Maintain Anaerobic Digestion

P6. Safely carry out operational and first line maintenance tasks relating to the process and ancillary equipment including removing blockages and fault finding
P7. Identify and retrieve current data and documentation governing wastewater quality / sludge recycling standards applicable to the process
P8. Identify and locate the anaerobic digestion processes and associated equipment on the works **and** on the information system e.g. SCADA / HMI
P9. Identify all mechanical, electrical and instrumentation assets which monitor and control the anaerobic digestion processes on the works **and** on the information system e.g. SCADA / HMI
P10. Identify and maintain control parameters associated with the anaerobic digestion processes and associated equipment
P11. Confirm the correct configuration, operation and performance of the anaerobic digestion processes and that they correspond to the information system e.g. SCADA / HMI
P12. Respond to alarms correctly
P13. Instigate corrective actions to restore the anaerobic digestion processes to compliant conditions, taking account of process lag time
P14. Evaluate trend data from the information system e.g. SCADA / HMI, tests and / or process performance to identify:
    a) Normal trends or cycles for the works, and
    b) Atypical trends or changes and the underlying or root causes for the change
P15. Optimise the anaerobic digestion processes to efficiently achieve the required parameters
P16. Identify any chemicals, storage, mixing and pumping plant used on the anaerobic digestion processes **and** on the information system e.g. SCADA / HMI

P17. Complete, record and report associated on-site monitoring to specification, appropriate to the works and to ensure the works process parameters are maintained
P18. Manage sludge holding facilities regarding quality and quantity to ensure optimum effectiveness of anaerobic digestion processes and wastewater treatment processes

Knowledge and Understanding

To achieve this unit, you will need to know and understand:

General Requirements

K1. The principles of Health, Safety and Environmental legislation in relation to working with wastewater treatment and sludge recycling
K2. The organisation's safety rules, policies and procedures relating to working with wastewater and sludge recycling
K3. The hazards associated with working with wastewater / sludge recycling and the correct way to respond to them
K4. How to select, inspect and use PPE when working with wastewater and sludge recycling
K5. How to carry out a site specific risk assessment and identify workplace hazards
K6. How to respond in the event of an emergency situation in the workplace environment
K7. How to leave the work area in a safe and secure condition
K8. The company recording and reporting process

Task Specific – Operate and Maintain Anaerobic Digestion

K9. How to safely carry out operational and first line maintenance tasks taking into account any systems of work and operating procedures
K10. The current legislation and directives that control anaerobic digestion and sludge recycling and disposal
K11. The benefits of anaerobic digestion
K12. The chemical, biological, microbiological and physical differences of primary, secondary and septic sludge's and their impact on the anaerobic digestion process
K13. How to carry out sampling and analysis and control the process based on the results to ensure effective operation of an anaerobic digester
K14. How to control sludge storage facilities regarding quality and quantity
K15. The processes required to deliver suitable sludge for anaerobic digestion and the implications of not achieving the quality or quantity required
K16. The main types of digestion processes available, their ranges and requirements and the design considerations associated with these
K17. The main types of advanced digestion processes available, their ranges and requirements and the design considerations associated with these

K18. The stages of digestion within the relevant system and the required temperature ranges
K19. Digester heating systems and ancillary equipment
K20. Types of digester mixers, benefits and limitations
K21. The main types of gas storage systems and ancillary equipment available, their ranges and requirements and the design considerations associated with these
K22. The Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), zoned areas and how to safely work in them
K23. Working volumes of digesters, feed volumes, rates and regimes; organic loadings and retention times and issues that can impact available performance
K24. The importance of pH and alkalinity
K25. What causes digester foaming and options for controlling it
K26. Critical control point monitoring and reporting requirements prior to recycling to agricultural land, including sampling / testing regimes
K27. Gas production, its potential uses, management and optimisation
K28. Combined Heat and Power (CHP), its benefits, regulation, issues, management and optimisation
K29. Gas testing and its relevance to digester performance
K30. Sludge liquors and their management
K31. Digester shut down / start up procedures
K32. How to interrogate the information system e.g. SCADA / HMIs to evaluate trend data differentiating normal operational cycles from developing fault conditions or emerging risks
K33. Alarms, associated consequences with the process, action levels, authorisation levels
K34. The importance of sampling from the correct locations, using approved techniques
K35. The consequences of inaccurate sampling, analysis, recording and reporting
K36. Data collection, recording, reporting and maintenance requirements

How will it be assessed?

To achieve this unit, you will need to be able to provide evidence of the performance criteria and the knowledge and understanding requirements listed above.

Assessment types:

1. External assessment – an external accrediting body will assess against a national minimum standard
2. Internal assessment process – a company led on-going assessment against requirements
3. End-point assessment – see assessment plan for further details here (will be Energy & Utility Skills defined)

What type of evidence will be expected?

To achieve this unit, you will need to be able to provide evidence of the performance criteria and the knowledge and understanding requirements listed above.

Evidence types:

1. On-going local assessments
   a) Assessment plan, review, feedback, standard assessment sheets
2. Knowledge based learning
   a) Classroom, exams, assignments, Q&A sessions, e-learning modules
3. Evidence portfolios
   a) Learning logs, photos, observation sheets

Assessment types and process