

Bioresources - Tankered Trade Waste			
Document Title	SOP10 Standard Sampling Tests		
Document Owner Role	Process Manager	Version Number	3.0
Date of Last Review	13/01 /22	Date of next Review	13/01/24
Identified Risks			
<ul style="list-style-type: none"> • HS&W risks associated with unsuitable / volatile / hazardous waste streams. • Excessive solids could damage the pipework infrastructure • Activated Sludge Process lanes collapse: from Overloading of nutrients <ul style="list-style-type: none"> ○ Inhibition of the microbial activity through the introduction of too many inhibitory compounds such as metals or cyanide or pH concentrations are too extreme • Digesters inhibits Methane (CH₄) generation due to: <ul style="list-style-type: none"> ○ excessive volume of heavy metals such as Chromium (Cr III) and Cadmium (Cd) ○ They can poison the active bacteria and inhibit the methanogenic bacteria ○ This leads the presence of organic acids • Combined Heat Power process impacted by: <ul style="list-style-type: none"> ○ High concentrations of Hydrogen Sulphide (H₂S) can damage engines ○ High concentrations of Siloxanes (Si) pas through the biogas and result in silica deposits. ○ These damage the engine valves, oil life etc. leading to greater downtime and more equipment to be replaced • Compliance risks <ul style="list-style-type: none"> • Loss of waste permits if waste not listed on them permitted or waste does not have the appropriate EWC. • Final effluent discharge consents missed due to high solids or heavy metals or Phosphorus (P) • BAS Compliance for Bio-solids non-conforming if too high metal content • Wider environmental damage from failures of the treatment processes due to unsuitable waste streams being accepted. 			
<p>If this is a printed version please ensure that it is still within the current review period, if not 'DO NOT USE' and contact your line manager for a new version</p>			
<p style="text-align: center;">Remember – If you can't do the job safely, don't do it. 'DO NOT CARRY OUT THE PROCEDURE' And seek advice from your line manager</p>			

Introduction
The standard sampling tests are used to make sure that all tankered trade waste deliveries conform to the waste stream's approved analysis (see SOP 02 and SOP 03 for more information). This provides a safeguard against detrimental impact on the sewage treatment process.

Key Roles and Responsibilities	
Tankered Trade Waste Manager (TWM):	<ul style="list-style-type: none"> ○ Ensure that the operating procedures are followed ○ Ensure that the Tankered Trade Waste Technicians (TTWT) have undergone appropriate training ○ Can make approval decisions if they have been deemed as technically competent ○ Investigate HSW & Environmental concerns from the TTWT

Tankered Process Team (TPT):	<ul style="list-style-type: none"> ○ Ensure that the operating procedures are followed ○ Assess non-conformance risks to treatment process and make suitable decisions to ensure process is not adversely affected ○ Notifying the commercial team once a decision has been made to reject a delivery
Tankered Trade Waste Technicians (TTWT)/Technical Competent Persons(TCP):	<ul style="list-style-type: none"> ○ TTWT have undergone appropriate training and have a valid CMS certificate ○ TTWT have been deemed as technically competent ○ Has a valid gas monitor training certificate ○ Based on site analysis compare the UKAS lab results and ensure that these match/show that it is the same waste stream ○ Follow the non-conformance procedure if a waste is not suitable and do not permit the load to discharge
Commercial Team:	<ul style="list-style-type: none"> ○ Liaise with TTWT regarding non-conformance issues ○ Contact customer if more information is required about a non-conformance ○ Contact customer if waste delivery is rejected
Tanker Driver:	<ul style="list-style-type: none"> ○ Tanker driver must have a STW induction card, or be given an induction by the TTWT ○ Must adhere to STW PPE and safety regulations whilst on site ○ Must give a representative sample from his waste delivery ○ Tanker driver must be willing to take further samples if the waste does not comply with approved analysis of the waste stream

Required Training

Tankered Trade Waste Technicians (TTWT)	<ul style="list-style-type: none"> ● In date EMS training ● Gas monitor training ● At least 6 months experience in the waste industry (if they are approving low risk wastes) HNC Chemistry, University Degree in a Scientific area or similar experience ● Experience undertaking sampling and lab testing ● How to use CWID
Tankered Process Team (TPT)	<p>The requirements for the TTWT in addition to:</p> <ul style="list-style-type: none"> ● Tankered Waste experience or 12 months experience in the waste industry ● CIWM Hazardous Waste Classification course ● Cranfield University Biological Processes/Activated Sludge Treatment course ● University degree or similar level of experience and knowledge in a Scientific Area
Tankered Trade Waste Manager (TWM):	<ul style="list-style-type: none"> ● In date EMS training ● Experience of working in the Waste Industry ● Understanding of Health, Safety, Wellbeing and Environmental Compliance

Documentation & Resources

<ul style="list-style-type: none"> ● Standard Operating Procedures (SOP) ● CWID (Commercial Waste Information Database) ● Sample of the waste ● pH Meter (correctly calibrated) ● Chemical Test Strips ● Gas monitor
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Procedure:

Appearance Check

Do a visual inspection of what the waste sample looks like:

- Colour
- thickness of waste
- Are any layers present?

Odour Check

- Use a gas monitor to check for Methane (CH₄), Hydrogen sulphide (H₂S) and Carbon monoxide (CO)
- Gently sniff the sample to ascertain if there are any unusual smells such as oil or diesel. Check for any chemical odours, which are not usual for that type of waste.

pH Test

The TCP should ensure that the pH meter is calibrated – *see relevant SOP*

- Place the pH electrode into the TTW sample and wait for the pH reading to stabilise (a 'right angle' will show on screen). Press 'Read' to confirm the measurement.
- Record the result.
- The standard conforming pH is pH 4-10, but different sites can vary - Always check the limits of the site and site specific guides.
- If the pH is too high, it may prevent the rest of the tests (except the nitrates/nitrites) from working accurately. In this case, put a small sample into a beaker, and add the chromate reagent (Nitric acid) to lower the pH. Do not add the chromate reagent when testing the nitrates or nitrites because the nitric acid will give a false result.
- If the pH is too low, add a small sample into a beaker and add some ammonia or zinc reagent (Sodium hydroxide) to raise the pH.

Chemical Test Strip Checks

Notes:

- *With all except the ammonia, zinc and chromate tests, the strips can be dipped straight into the waste sample, providing the pH is within range.*
- *Ensure the pH range for measurement is between 4-10 using chromate reagent (nitric acid) or the ammonium reagent (sodium hydroxide) to drop or increase the pH respectively.*

Nitrite/Nitrate:

1. The pH should not be lowered for the nitrates test
2. Dip the nitrite/nitrate test strip into the waste sample for 1 second.
3. Remove the test strip, shake off excess liquid from it and wait for 60 seconds.
4. Check the colour against the test kit chart to determine the nitrite/nitrate levels within the waste sample.
5. Record the result.



Figure 1. Nitrate & Nitrites test kit

Sulphate:

1. Dip the sulphate test strip into the TTW sample for 1 second.
2. Remove the test strip, shake off excess liquid from it and wait for 120 seconds.
3. Check the colour against the test kit chart to determine the sulphate levels within the waste sample.
4. Record the result.



Figure 2. Sulphates test kit

Nickel:

1. Dip the nickel test strip into the TTW sample for 1 second.
2. Remove the test strip, shake off excess liquid from it and wait for 30 seconds.
3. Check the colour against the test kit chart to determine the nickel levels within the TTW sample.
4. Record the result



Figure 3. Nickel test kit

Copper:

1. Dip the copper test strip into the TTW sample for 1 second.
2. Remove the test strip, shake off excess liquid from it and wait for 20 seconds.
3. Check the colour against the test kit chart to determine the copper levels within the TTW sample.
4. Record the result



Figure 4. Copper test kit

Iron:

1. Dip the iron test strip into the TTW sample for 1 second.
2. Remove the test strip, shake off excess liquid from it and wait for 20 seconds.
3. Check the colour against the test kit chart to determine the copper levels within the TTW sample.
4. Record the result



Figure 5. Iron test kit

Chromium:

1. Place 5 ml of the TTW sample into a sampling test tube.
2. Add 10 drops of chromate reagent (nitric acid) into the test tube.
3. Dip the chromium test strip into the test tube for 1 second.
4. Remove the test strip, shake off excess liquid and wait for 30 seconds.
5. Check the colour against the test kit chart to determine the chromium levels within the TTW sample.
6. Record the result



Figure 6. Chromium test kit

Zinc:

1. Place 1ml of the TTW sample into a sampling test tube.
2. Add 10-12 drops of the zinc reagent (sodium hydroxide) to the test tube and shake the solution.
3. Dip the zinc test strip into the test tube sample for 1 second.
4. Remove the test strip, shake off excess liquid from it and wait for 30 seconds.
5. Check the colour against the test kit chart to determine the zinc levels within TTW sample.
6. Record the result



Figure 7. Zinc test kit

Ammonia:

1. Place 1ml of the TTW sample into a sampling test tube.
2. Add 10-12 drops of the Ammonia reagent (sodium hydroxide) to the test tube and shake the solution
3. Dip the ammonium test strip into the test tube sample for 5 seconds.
4. Remove the test strip and shake off excess liquid from it.
5. Immediately check the colour against the test kit chart to determine the ammonium levels within the TTW sample.
6. Record the result



Figure 8. Ammonia test kit

Dilutions:

- If there is any doubt about the result, or it is beyond the scale of the test kit colour chart, then do a dilution to get the true reading.
- For a 1:9 dilution, add 1 ml of the TTW sample into a test tube, and add 9 ml of clean water.
- For an ammonia or zinc dilution, add 10 drops of the ammonia / zinc reagent and shake the test tube.
- For a chromate dilution, add 10 drops chromate reagent.
- Insert the appropriate test strip and follow the procedure for the appropriate test.
- Multiply the reading by your dilution factor to get the true result.

Staining:

Staining discolours the indicator paper, making it difficult to read the result. If staining occurs, use the following steps:

- Fold the test strip over on the long edge just before the colour-changing indicator, so that you have a handle and dip the bottom half of the indicator into the sample as you follow the appropriate test.
- Watch the colour change that spreads over the unstained half of the indicator and compare the unstained half to the side of the test kit to get the reading.
- Use dilutions as needed.

References:

- Technical Guidance WM3: Waste Classification – Guidance on the Classification and assessment of Waste
- BREF for Waste Treatment 2018
- Site Permits
- SOP 02 TTW Waste Acceptance
- SOP 03 TTW Non-conformance
- SOP 11 Sewage Sludge Approval
- SOP 17 Biosolids Acceptance & delivery

Version Control			
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