

Standard Operating Procedures		SOP Ref:	LTP LAB 13	
Approved & Issued by:	Lindsey Dryden		Written by:	Bradley Currie
Operational Area:	BKP Environmental Romsey, Laboratory			
Title:	Compatibility Testing			

1. Activity

This procedure details compatibility testing for waste substances that will be assessed prior to bulking, either to bulk road tanker or into IBCs and Drums. This is done to ensure that no adverse or unexpected reactions occur during these bulking operations, and we conform to the EA/HSE guidance documents on compatibility testing.

EA/HSE guidance documents states:

'It is critical that potential adverse reactions are identified and avoided during bulking. Although some adverse reactions can be readily anticipated and the mixing of those materials prevented, other adverse reactions may not be foreseen. Reactions which may pose a risk include exothermic (heat generating) chemical reactions and reactions which generate a non-condensable gas as a by-product'.

'Adverse reactions of particular concern are:

- reactions that generate heat and cause an increase in the vapour pressure of the mixture (potentially to boiling conditions), and / or*
- reactions that generate permanent gas or volatile products.'*

'Small temperature increases, in the absence of gas generation, may be tolerable. However, if the temperature of the mixture can rise by more than 10 K or to within 10 K of the boiling point, then a risk exists of either creating a positive pressure in a sealed vessel or generating a significant quantity of vapour. Either of these cases would be considered as unacceptable for a bulking process and the proposed bulking operation should be disallowed. If the temperature rise is smaller (<10 K) and will not reach within 10 K of the boiling point, compatibility testing must be performed to fully characterise and confirm the thermochemistry'.

'Many vessels used as bulking tanks, particularly vessels manufactured of plastic or composite materials, may not tolerate elevated temperatures. In this case, more stringent allowable temperature rise limits may be appropriate'.

This procedure should only be carried out by a suitably qualified and experienced Site Chemist, minimum requirement HNC or equivalent in Chemistry or related subject.

2. Persons at Risk

- Operator
- Other yard operatives
- Driver
- General public
- Contractors and visitors

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- Shared Site Occupancy
- Laboratory chemist

3. Hazards

- Pressurised tanker
- Formation of toxic gases
- Exposure to chemicals within the waste material

4. Procedures

a) You as the Operator

The following PPE shall be worn as a minimum, additional PPE / RPE maybe required for certain waste streams, such as an air fed hood for solvents:

- Safety glasses
- Chemical resistant gloves
- Safety boots
- High visibility vest or jacket
- Head protection
- Chemical resistant apron / disposable overalls

To complete this operation, you will be working in the designated laboratory area, using clean equipment to ensure no contamination in samples. The equipment described in Step 3 below is essential. During this operation you should be wearing a lab coat, gloves and safety glasses as a minimum.

Identification of Wastes:

The Site Chemist should identify a batch of waste substances that can potentially be bulked together by carrying out a desk top assessment in the first instance. The following shall not be bulked together in any circumstances:

Acid – Alkali
 Flammable – Oxidisers
 HP12 – Acid
 Hypochlorites – Ammonia
 Nitrates

For further information, refer to Section 10 of the MSDS.

If in any doubt of the suitability of bulking waste substances together, seek further advice from a Senior Site Chemist or Technical Director.

The following steps must then be followed before any bulking can take place.

Desktop Assessment:

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A Desktop Assessment must be carried out for ALL wastes that have been identified for bulking.

The Desktop assessment is carried out for the following reasons:

- To allow bulking between up to two different chemical components
- To allow bulking where clear evidence can be produced that no adverse reactions have occurred when the same or similar waste have been bulked together previously
- To act as a Risk Assessment for Laboratory Compatibility Test

It is important to ensure that no incompatible compounds are mixed via this process. I.e., oxidising and flammable compounds, acid and alkali, ammonia and hypochlorite, no compounds with HP6 category 1 and 2 properties, organic peroxides or highly reactive compounds and polymerisable materials such as isocyanates. Prior to compatibility testing, it is important to check sections 10 of the compounds MSDS to ensure that incompatibles are not mixed. The pH of each sample is checked prior to any addition.

Compatibility Testing:

The LTP LAB 13a Compatibility Test form tab a should be completed, detailing all the required information to carry out the initial Desktop Assessment. This information will include:

- Ticket Number
- Date of waste received
- Quantity and Size of material to be bulked
- Any hazardous chemical components
- pH, odour, Flashpoint and any reactive properties of the substance
- Container size and type used to bulk into

Step 1. Waste Details

Complete the details for each waste stream considered for bulking using the ticket reference taken from each waste container. The test reference is the next number from the LTP LAB 13a Compatibility Test Log.

Step 2. Odour Assessment

Each waste considered for bulking needs to be assessed for odour in accordance with Section 2 of QME007 Odour Management Plan. The scale used is as follows: Odour Intensity Scale & Description

- | | |
|---|---|
| 0 | No detectable odour |
| 1 | Faint odour (barely detectable, need to stand still and inhale facing into wind) |
| 2 | Faint to moderate (detectable when moving but not offensive) |
| 3 | Moderate odour (odour easily detected while walking and breathing normally, possibly offensive) |
| 4 | Strong odour (bearable, but offensive- will my clothes/hair smell?) |
| 5 | Very strong/Severe odour (this is when you really wish you were somewhere else) |

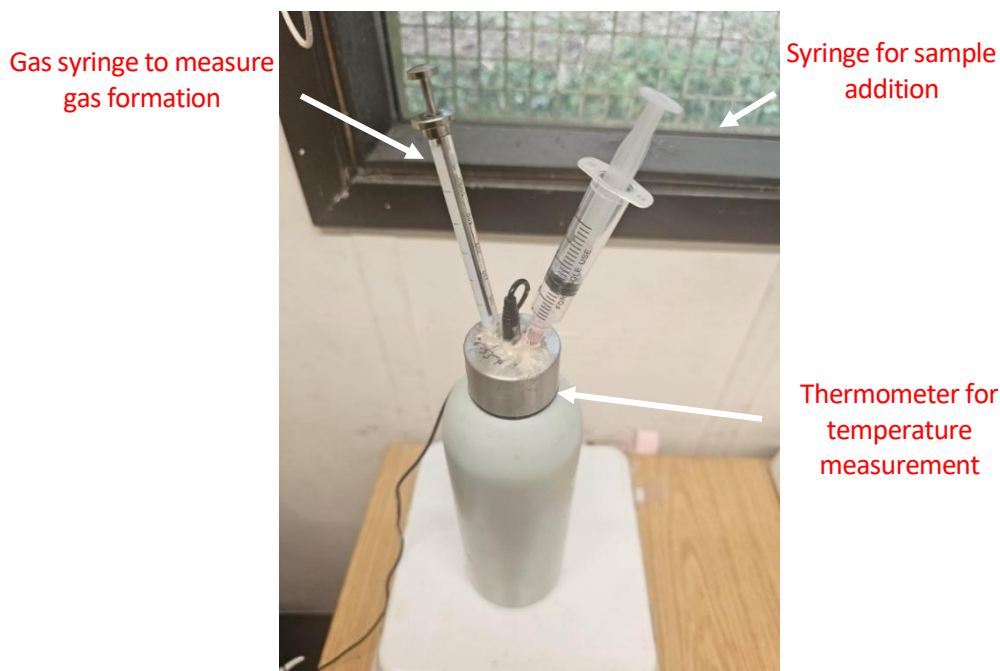
Step 3. Mixing of potential bulking components

A repurposed thermos has been created to allow for the determination of compatibility. This thermos fitted with a syringe adaptor (to allow bulking samples to enter the system), a gas syringe (to measure gas formation) and a thermometer (to measure temperature fluctuations) attached to the lid to allow a complete seal, preventing loss of insulation. A stirrer bar has also been added within the flask to ensure proper mixing whilst undergoing compatibility testing. The repurposed thermos is shown in the photo below:

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Samples are implemented within the device, dependant on the initial storage of the sample (IBC or Drum), for an IBC 20 mL, and for a drum 4 mL is added. Each time a sample is added allow 10 minutes to pass to ensure that no reaction is occurring. After 10 minutes have passed take note of the temperature and if no gas formation/precipitation significant temperature fluctuation is visualised add the next sample. If one of these are noted the samples can be tested in a different order which may prevent that specific matrix from being formed and thus the unwanted effect may be bypassed. All results are stored in LTP LAB 13a Compatibility Test Log.

The composite sample, once completed, shall be monitored at 30-minute intervals to check for any increases in temperature and/or gas formation/precipitation, for at least 3 hours in total and the results stored in LTP LAB 13a Compatibility Test Log. If after 3 hours there are no changes then the bulking operation can commence.

Samples

Samples should be retained for a minimum of 1 month following treatment of the waste. After 1 month the samples shall be disposed of in accordance with all relevant legislation at the suitably licenced facility.

NB: You must not proceed to sign this form if you feel you do not fully understand the methods and procedures outlined in this Standard Operating Procedure

Print: Sign: Date.....

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Signed off by:

..... Director / Manager / Supervisor

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