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APPENDICES

APPENDIX 27

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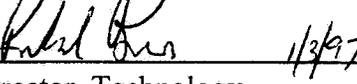
SOP No. CORP-WC-0004
Revision No. 0
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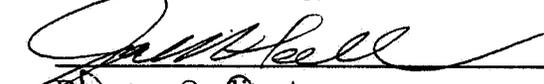
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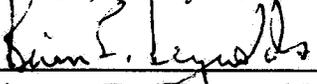
**TITLE: IGNITABILITY OF SOLIDS FOR WASTE CHARACTERIZATION
EPA SW-846 CHAPTER 7, SECTION 7.1**

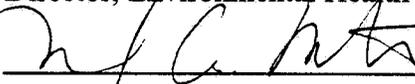
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Prepared by:  1/3/97
David Dawes and Richard Burrows

Reviewed by:  1/3/97
Director, Technology

Approved by: 
Director, Quality Assurance

Approved by: 
Director, Environmental Health and Safety

Approved by: 
Management

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1. SCOPE AND APPLICATION

- 1.1. This method is applicable to the determination of ignitability of solids as it pertains to waste characterization outlined in Chapter 7 of EPA SW846. It is used to identify wastes that are fire hazards under routine storage conditions or which are capable of "severely exacerbating" a fire that is already burning.
- 1.2. There is no instrument or method detection limit applicable to this test. Results are reported qualitatively as either "Yes" or "No" depending on the ignitability of the sample.
- 1.3. Applicable Matrices: Solids, including domestic and industrial wastes, sludges, and petroleum wastes.
- 1.4. The analytical time depends on the matrix and method of analysis. For solids, the analytical time is approximately 5 minutes.

2. SUMMARY OF METHOD

- 2.1. Solids are analyzed by exposure to open flame for a set length of time after which the flame is removed and the sample observed to determine its ignitability characteristic. If the material will burn, a subsequent set of tests determine ignitability according to the definitions in Chapter 7 of SW-846.

3. DEFINITIONS

- 3.1. Ignitability: The capability of a solid sample, under standard conditions of temperature and pressure, to cause fire through friction, moisture absorption, or spontaneous chemical changes and, when ignited, to burn so vigorously and persistently as to create a hazard.

4. INTERFERENCES

- 4.1. Improper storage of samples may cause loss of volatiles and lead to erroneous results.

5. SAFETY

- 5.1. Procedures shall be carried out in a manner that protects the health and safety of all Quanterra associates.

- 5.2. Eye protection that satisfied ANSI Z87.1 (as per the Chemical Hygiene Plan), laboratory coat, and appropriate gloves must be worn while samples, standards, solvents, and reagents are being handled. Disposable gloves that have been contaminated will be removed and discarded; other gloves will be cleaned immediately.
- 5.3. The health and safety hazards of many of the chemicals used in this procedure have not been fully defined. Additional health and safety information can be obtained from the Material Safety Data Sheets (MSDS) maintained in the laboratory.
 - 5.3.1. Because of the unknown reactivity of the materials being tested, the operator will wear a face shield in addition to safety glasses. As an alternative, the sash of the hood will be pulled down to shield the operators face.
- 5.4. Exposure to chemicals must be maintained **as low as reasonably achievable**, therefore, unless they are known to be non-hazardous, all samples must be opened, transferred and prepared in a fume hood, or under other means of mechanical ventilation. Solvent and waste containers will be kept closed unless transfers are being made.
- 5.5. In order to stabilize conditions during the actual test, the fume hood when the test is being conducted may be turned off.
- 5.6. All work must be stopped in the event of a known or potential compromise to the health and safety of a Quanterra associate. The situation must be reported **immediately** to a laboratory supervisor and/or the EH&S Coordinator.

6. EQUIPMENT AND SUPPLIES

- 6.1. Ceramic crucibles, nominal 50 mL capacity.
- 6.2. Source of open flame: "barbecue" butane lighter, or equivalent. NOTE: a butane cigarette lighter, short wooden matches, or a high temperature propane torch are not acceptable alternatives.

7. REAGENTS AND STANDARDS

- 7.1. There are no reagents and standards required for this method.

8. SAMPLE COLLECTION, PRESERVATION AND STORAGE

- 8.1. Samples are to be collected in glass bottles or jars with a minimum of headspace and refrigerated to $4 \pm 2^{\circ}\text{C}$.
- 8.2. There is no specified holding time for ignitability .

9. QUALITY CONTROL

- 9.1. The Quanterra QA Management Plan document provides further details of the QC and corrective action guidelines presented in this SOP. Refer to this document if additional guidance is required.
- 9.2. Sample/Sample Duplicate (SA/DU) - One Sample/Sample Duplicate pair must be processed for each QC batch per matrix, or every 20 client samples, whichever is more frequent.
 - 9.2.1. The results of the SA/DU pair are used to determine analytical variability.
 - 9.2.2. The SA/DU pair is evaluated qualitatively. If both the sample and its duplicate are found to be either both ignitable (YES/YES) or both not ignitable (NO/NO), the QC is considered in control.
 - 9.2.3. The SA/DU QC is out of control if the two results are different (YES/NO). In this case, the data must be qualified appropriately (e.g. sample heterogeneity) and an explanation provided in the report narrative.
 - 9.2.4. There are no other QC analyses applicable to this test.

10. CALIBRATION AND STANDARDIZATION

- 10.1. This method has no calibration or standardization requirements.

11. PROCEDURE

- 11.1. Any significant variation in procedure shall be completely documented using a Nonconformance Memo.
- 11.2. In a fume hood, place a small quantity of sample (approx 1 gram) into the ceramic crucible. It is not necessary to weigh the sample, but a small quantity should be used to minimize any potential hazards.

- 11.3. Wear a face shield in addition to safety glasses, or pull the hood sash down to act as a shield. Turn off the hood (if necessary to maintain a stable flame), touch the ignition source (see section 6.2) to the sample. Keep the flame in contact with the sample for 5 ± 2 seconds.
- 11.4. Remove the ignition source and observe the sample.
- 11.5. Turn the fume hood back on. (if previously turned off).
- 11.6. Observations can be reduced to three broad categories:

Reaction of Sample	Classification
Sample does not ignite	Not ignitable, no further testing necessary
Sample ignites but burns only in contact with flame	Not ignitable, no further testing necessary
Sample ignites and burns continuously	Proceed to section 11.6.1

11.6.1. Wear a face shield in addition to safety glasses, or pull the hood sash down to act as a shield for the following steps. Place approximately 5g of solid into a crucible and stir for 10 seconds. If the sample ignites and burns continuously, then it is classified as ignitable. If not, proceed to section 11.6.2

11.6.2. Add 5 mL of water to the sample in the crucible. If the sample ignites and burns continuously, then it is classified as ignitable. If not, proceed to section 11.6.3.

11.6.3. Add approximately 5g of solid to a crucible. Heat the crucible from underneath with a burner for 30 seconds. If the sample ignites and burns continuously, then it is classified as ignitable. If not, the sample is classified as not ignitable.

12. DATA ANALYSIS AND REPORTING

- 12.1. If the result is "Ignitable", report as "Yes".
- 12.2. Samples which do not meet the "Ignitability" criteria should be reported as "No."

13. METHOD PERFORMANCE

- 13.1. Training Qualifications: The group/team leader has the responsibility to ensure that this procedure is performed by an associate who has been properly trained in its use and has the required experience.

14. POLLUTION PREVENTION

- 14.1. Sample volumes have been reduced (maintaining proper ratios) in order to minimize laboratory waste.

15. WASTE MANAGEMENT

- 15.1. Waste generated in the procedure must be segregated and disposed according to the facility hazardous waste procedures. The facility Environmental Health and Safety Coordinator should be contacted if additional information is required.
- 15.2. Dispose of samples in accordance with Quanterra waste disposal policies.

16. REFERENCES

16.1. Source Methods

- 16.1.1. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA SW846, 3rd edition, Chapter 7, "Ignitability", revision 2, September 1994.