



SUMMARY TEST RESULTS - Emission assessment during fluorescent bulb recycling using PestWest Vapor Vacuum Lamp Compactor

PestWest Electronics Ltd contracted an independent company to carry out laboratory tests to monitor and report on the point source exhaust emissions during a test of the PestWest Vapor Vacuum Lamp Compactor. Specifically, the company were asked to measure mercury levels at and around the machine during and after the crushing of fluorescent lamps.

Occupational mercury vapor exposure limits

Occupational exposure guidelines are designed to protect most workers under normal working conditions (i.e. 8-hour days, 5 days a week for the duration of a working lifetime) it is assumed that healthy adults, when exposed to these levels, would not suffer any harmful effects. These occupational exposure guidelines are not intended to be applied to community exposure.

Exposure levels routinely are found from three sources. The Occupational Safety and Health Administration's (OSHA's www.osha.gov) set limits are legal requirements for occupational exposure: exceeding OSHA limits violates the law and is punishable by fines. US states can, however, set their own occupational limits. The American Conference of Governmental Industrial Hygienists (ACGIH www.acgih.org) also publishes exposure limits. These recommended limits are updated regularly and are considered the most comprehensive and influential exposure guidelines in the country. The third source of exposure limits is the National Institute of Occupational Safety and Health (NIOSH).

Occupational exposure limits for inorganic mercury

	OSHA*	ACGIH	NIOSH
Ceiling	100 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$	---
8-Hr TWA	---	50 $\mu\text{g}/\text{m}^3$	25 $\mu\text{g}/\text{m}^3$

* Regulatory Limit as revised 28 July 2003.

Pre-test mercury vapor measurements

Mercury is a naturally occurring substance that is present in very small quantities in the air due to natural processes, such as volcanoes and forest fires, and due to human industrial activities.

Linear bulb crushing results using PestWest Vapor Vacuum Lamp Compactor

An initial test with the first bulb indicated that no mercury was exhausted from the filter unit. Bulbs were then fed into the machine while additional mercury measurements were taken and recorded at on and around the PestWest Vapor Vacuum Lamp Compactor.

Mercury vapor levels measured during linear bulb crushing using PestWest Vapor Vacuum Lamp Compactor

Location	Mercury Concentration ($\mu\text{g}/\text{m}^3$)			Comments
	Reading 1	Reading 2	Reading 3	
Filter Unit Exhaust	0.016	0.016	0.015	After addition of 1 st bulb
Filter Unit Exhaust	0.016	0.015	0.015	After 2 nd bulb addition
Drum Seal	0.064	0.048	0.035	During continuous feed
Linear Bulb Intake	0.014	0.014	0.015	
Drum Seal	0.017	0.016	0.020	Additional seal location
Filter Unit Exhaust	0.016	0.017	0.018	
Hose	0.016	0.020	0.019	At connection to crusher
Hose	0.016	0.017	0.019	At connection to filter
Drum Seal	0.088	0.094	0.089	Additional seal location
Drum Seal	0.033	0.040	0.043	Additional seal location
Drum Seal	0.110	0.132	0.124	Additional seal location
Drum Seal	0.029	0.031	0.033	Additional seal location
Breathing Zone	0.028	0.031	0.033	At face level
Filter Unit Exhaust	0.043	0.044	0.044	
Drum Seal	0.144	0.151	0.101	Additional seal location

Conclusion

The purpose of the test was to determine how effective the PestWest Vapor Vacuum Lamp Compactor seals and vacuum systems worked at controlling ambient mercury levels around the unit during operation and, where appropriate, to identify possible sources of leaks or operating practices that could increase emissions.

Test results show that the PestWest Vapor Vacuum Lamp Compactor with the vacuum system operating was capable of crushing fluorescent bulbs without creating any increase in the ambient mercury levels. In fact the mercury emissions, proved to be so low that it was undecided whether the emissions were from the machine or just natural mercury content in the air.

Fluorescent lamp recycling and compacting solutions

Toll free: 1.866.476.7378
Fax: 941 358 1916

*Complete test results available upon request.