

High Temperature Incinerator

Technical Specification

Generic Template

Introduction

The Liberia Medicines & Health Products Regulatory Authority (LMHRA) started its pharmaceutical waste management in 2012 and later acquired a four acre of land for Pharmaceutical waste management in Liberia. Four incinerators were donated since 2015 by MSF to the LMHRA but have now outlived their usefulness. However, two of them are still operational but need repairs and maintenance. The site is currently located in King's Farm, Careysburg District, in Montserrado County. The type of waste that are managed since the establishment of the disposal site is all pharmaceutical waste and its associated wastes. Waste generators such as County Depots, the CMS and the private sector notify the Authority on available waste and there are no logistics and transportation to collect the waste.

On the other hand, there are two functional medical waste incinerators situated in Curran Hospital in Lofa while one is located at the National Reference Laboratory facility in Margibi County (provided by NPHIL). Major challenges faced are waste transportation and logistics. From June 12 to July 15, 2023, 50 healthcare facilities were assessed for the status of medical incinerators across the country, two (2) of the facilities had functional pyrolytic incinerator, 22 facilities had none functional pyrolytic incinerator, 34 had demont-fort incinerator with 19 of the 34 functional (NPHIL). Total estimated waste currently in the country.

Technical Specification

No	Item	Required Specification
1	General	
1.1	Type of waste	<i>Suitable for the treatment of the following waste types [delete as appropriate]:</i> <ul style="list-style-type: none"> - Pharmaceutical Products - <i>Chemical</i> - <i>Cytotoxic</i> - <i>Cytostatic</i> - <i>Infectious</i> - <i>Anatomical</i> - <i>Sharps</i>
1.2	Treatment method	High Temperature Incineration (dual chamber) with auxiliary burner and flue gas treatment.

No	Item	Required Specification
1.3	Number of chambers	Two (dual chamber configuration)
1.4	Construction material	Both combustion chambers are lined with high quality fireproofed multi-layered refractory lining which can durably withstand the design temperature. Robust mild steel casing. Primary chamber rated up to 1650°C.
1.5	Burn rate	<i>Between 250 - 360kg/hr</i>
1.6	Maximum load capacity	Subject to burn rate but between 100 - 1300kg
1.7	Load method	Automatic. Top loading. Loading system must prevent contact between the operator and processing heat.
1.8	Combustion chamber operating temperature	Minimum of 850°C in the first chamber. Minimum of 1100°C in the second chamber.
1.9	Gas retention time	Minimum of two seconds in the secondary combustion chamber or a duration sufficient to adequately render waste safe.
1.10	Turbulence	Maintain high turbulence of exhaust gases and reduction of excess air by injection of secondary air or recirculated flue gas. This can also be maintained with preheated airstreams or regulated air inflow.
1.11	Chimney height	30m
1.12	Period of operation (hours per day)	Minimum operation period of 8 hours per day.
1.13	Ash containment	The incinerator must have an ash bin or other suitable container to collect ash produced from the incineration process. The ash container must be adequately sized for the throughput of the incinerator and constructed from a material which can durably withstand heat.
2	Electrics and Controls	
2.1	Power supply	Single phase, 220-240v, 50-60Hz
2.2	Fuel type	Diesel (gas oil) or natural gas
2.3	System controls	Visual display to control and monitor incinerator performance. Controls must include a main and emergency switch, in addition to all other necessary operational controls.
2.4	Emissions control	Unit must comply with European Commission standards. Where the technology allows, emission control should ensure dioxin and furan air emissions are to no higher than 0.1 ng I-TEQ3/Nm10 (at 11% O ₂); and less than 0.1ng I-TEQ/l for any wastewaters discharged.
2.5	Emergency shut off	An emergency shut off or switch must be present on the control panel.

No	Item	Required Specification
2.6	Monitoring	Automatic continuous measuring and recording of opacity; oxygen (O ₂); carbon monoxide (CO), hydrogen chloride (HCl); and dust (TOC) and temperature of both combustion chambers.
3	Training	
3.1	Operator manual	Provided in <i>English</i>
3.2	Operator training	An operator training and support package is required. The training will be provided in-person during installation
4	Additional Equipment and Support	
4.1	Incinerator warranty	Minimum one year warranty. An additional year's warranty is desirable.
4.2	Installation and commissioning package	Support with incinerator installation and commissioning.
4.3	Maintenance package	An ongoing maintenance package is desirable. This may include access to in person or remote maintenance and trouble-shooting support.
4.4	Flue gas treatment	An anti-pollution flue gas cleaning system to reduce dust, dioxin and furan emissions. This system may include ceramic filters, cyclonic scrubbers and electrostatic precipitators. The flue gas treatment system must be linked to an appropriate wastewater drain.
4.5	Spare parts	Standard spare parts kit sufficient for three years of operation.
4.6	Maintenance tools and consumables	Complete set of tools which are required to conduct routine maintenance of the incinerator.
4.7	Fuel tank capacity	<i>As standard</i>
4.8	Fuel tank material	Stainless steel or polypropylene plastic
4.9	Weigh scales	Stand alone digital self balancing scales. Minimum weight limit of 20kg. Maximum weight limit of 1000kg.
5	Ancillary Infrastructure	
5.1	Groundworks	Incinerator should be installed on impermeable concrete surfacing. The site should be away from sensitive receptors and residential areas.
5.2	Incinerator housing	<i>Manufacture to share the layout and size of Incinerator house.</i> The shelter must adequately cover the equipment and prevent exposure to climatic conditions. A building with roof and four walls is therefore advisable. The building should be constructed with sufficient size and height to house the incinerator selected, with an aperture in the roof of sufficient diameter for the incinerator flue gas stack.

No	Item	Required Specification
5.3	Waste storage	<p><i>Insert minimum size (m³) required for the waste storage area. This is dependant on the volume of waste expected to be handled and local waste management arrangements.</i></p> <p>The area should be sufficient to store all incoming waste and residues prior to treatment or removal off site. The area should be secure and include space for the storage of spare bins, spare parts and maintenance.</p>