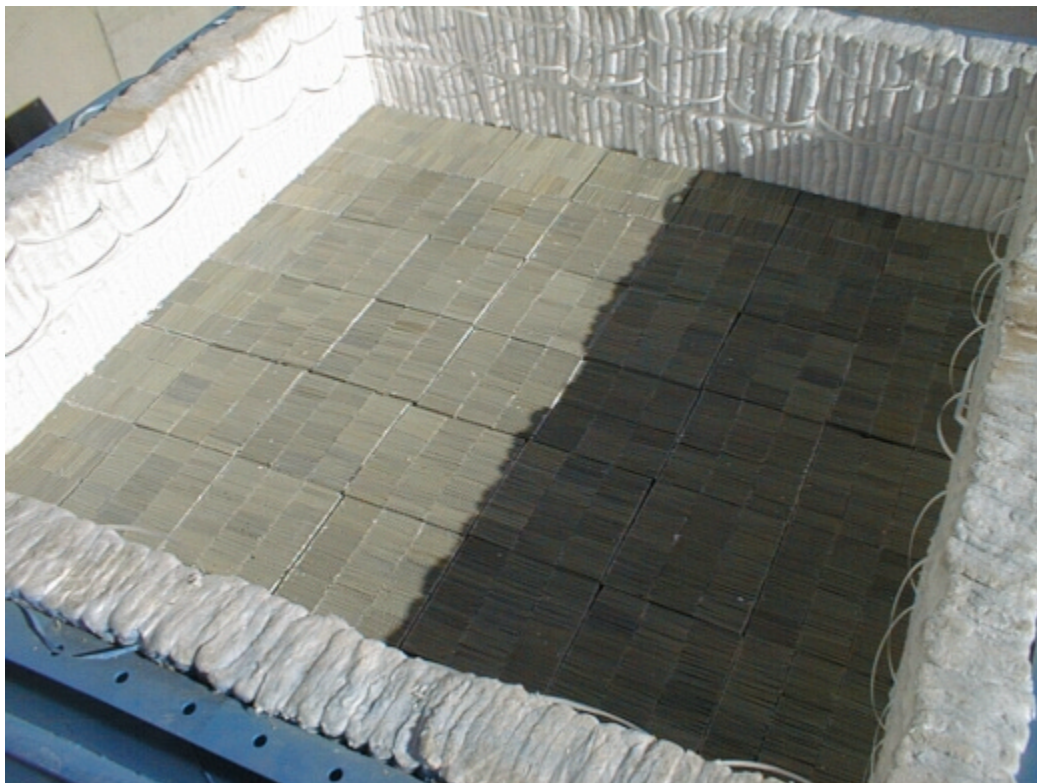


MLM[®]
Multi-Layer Media
for
Regenerative Thermal Oxidizers
from Lantec Products
Installation Manual



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1. Introduction

Multi-Layer Media (MLM[®]) from Lantec Products provides a unique combination of high heat capacity and low pressure drop, which serves to minimize the cost of operating a regenerative thermal oxidizer (RTO).

For optimum performance, it is essential that the MLM[®] be installed correctly. Please take the time to read these instructions and review them with your installation crew, to make sure that you get your money's worth from state-of-the-art media for heat recovery.

If in doubt, do not hesitate to contact Lantec Products for advice.

Note that these instructions are for the installation of MLM[®] in vertical-flow RTO canisters. The special measures required to install and stabilize MLM[®] in canisters with horizontal gas flow are not covered here.

2. Safety First

For ease of installation, MLM[®] is packaged in 12 x 12 x 4-inch or 12 x 6 x 6-inch modules which weigh up to 22 lb each. Workers who install MLM[®] are encouraged to wear lifting belts in order to reduce fatigue and minimize the risk of back strain, and to wear steel-toed boots.

Sturdy gloves should always be worn when handling MLM[®], because any breakage can produce very sharp edges. Protective eyewear and hard hats should also be worn. Abrasive dust particles can become airborne during handling of ceramic media, and the dust can cause eye injuries.

MSDS sheets for MLM[®] are available from Lantec Products.

3. Media Inspection on Arrival

When MLM[®] is delivered to a job site, the crates should be checked thoroughly for signs of damage during shipment. When fork-lifting crates out of a truck, the operator should listen and look for any signs of broken ceramic. If broken media is suspected, open the crate to verify whether the contents have been damaged. If significant damage is found, be sure to note it on the shipping document (Bill of Lading), submit a claim with the shipper and notify Lantec if you suspect replacement media is needed. Photographs of damaged media will help to document an insurance claim with the shipper so that you may get reimbursed for the damaged media in a timely manner and the replacement media can be delivered promptly. **Please note Lantec is in no way responsible for damage caused by the shipping company during transport.**

4. Proper Handling

Do not drop the media on a hard surface. MLM[®] is a ceramic product, and is fragile. Forklift operators should be careful and gentle when placing pallets. Sudden dropping of a pallet may cause some MLM[®] plates to break loose from the main blocks. If the



crates are lifted by a crane, a fork attachment should be used to avoid concentration of stress by straps.

It is recommended that the installers first open the top of a crate, then the front face, in order to remove the MLM[®].

Do not slide the blocks of MLM[®] across the block layer below, because blocks may catch on one another, causing plates to separate.

Do not place or rest a block on a sharp edge unless you intend to split it.

Installers may stand on the MLM[®], but must be careful not to break any plates.

5. Media Support Plate

In order to minimize the pressure drop across an RTO, the media should be



installed on a supporting structure which has as much open area as possible. A rectangular grid of metal bars spaced ~1 inch apart works well for MLM[®] modules, although smaller openings are needed if ceramic balls are used to fill gaps (See section 7, below)

Perforated metal plates of the kind used in RTOs packed with random media add unnecessary pressure drop. If MLM[®] is placed directly onto a perforated plate, a significant portion of the openings in the media will be blocked off, resulting in higher pressure drop and some impairment of heat recovery. If the air being treated is free of solid particulates, a base layer of 25-mm (1-inch) ceramic balls a few inches deep can be installed between the perforated plate and the MLM[®] to help redistribute the air.



A base layer of ceramic balls can also be installed if the media support plate has sloping perforated plates that form ridges and valleys.



Ceramic saddles are sometimes used for this purpose, as well. This procedure is not recommended for air streams laden with dust or condensables, because random media are more prone to plugging by accumulated solid particles.

If ceramic balls are installed to help redistribute air, spread them out evenly over the support grating. Ceramic balls are supplied by

Lantec in bags containing 25 liters (0.88 ft³) each, for easy handling. Ceramic saddles typically come in 40-ft³ supersacks. Each supersack should be lifted into the RTO canister using a crane. A draw-string on the bottom of the bag allows the bag to be opened from the bottom. The MLM[®] will then rest on these saddles. If saddles are not used, place the MLM[®] directly onto the support grating.

6. Installation



MLM[®] should not be installed until after the insulation along the inner walls of the canisters has been completed.

As MLM[®] is being installed in contact with the insulation, it is very important that the insulation be forced back to assure a tight fit. The insulation can shrink during normal operation. Compressing the insulation during installation will ensure a tight fit. The

insulation can be compressed with a mallet and a 2 x 4 plank to allow for proper installation of MLM[®].

MLM[®] modules should be laid flat in the heat recovery canister of the RTO, with all the openings facing upward. Every module should be flush against the adjacent ones, leaving no gaps between them.



Each canister is filled by installing one 4-inch layer of media at a time. All of the modules in a layer should be placed in the same orientation, with all the ceramic plates parallel to each other. The following layer should be installed similarly, but rotated 90° so that the plates are perpendicular to the plates in the layer beneath it.

The blocks in each layer should be installed continuously from one wall to the opposite wall.

7. Filling Gaps

When all the square modules of MLM® in one layer have been installed, if gaps remain between the media and the insulation layer on the canister walls, those should be filled with 19-mm (3/4-inch) ceramic balls to prevent air from bypassing the MLM®.



It is also possible to split modules and use loose plates of MLM® to fill as much as possible of any gaps near the walls, and to pack the rest of the gaps with ceramic fiber insulation, so that no air can bypass the media. Insulation may shrink after many heating/cooling cycles, so it is important to have it packed

as tightly as possible to reduce leakage.

Occasionally a plate will break out from a block of MLM®. The gap created by the missing plate can be filled in by another loose plate.

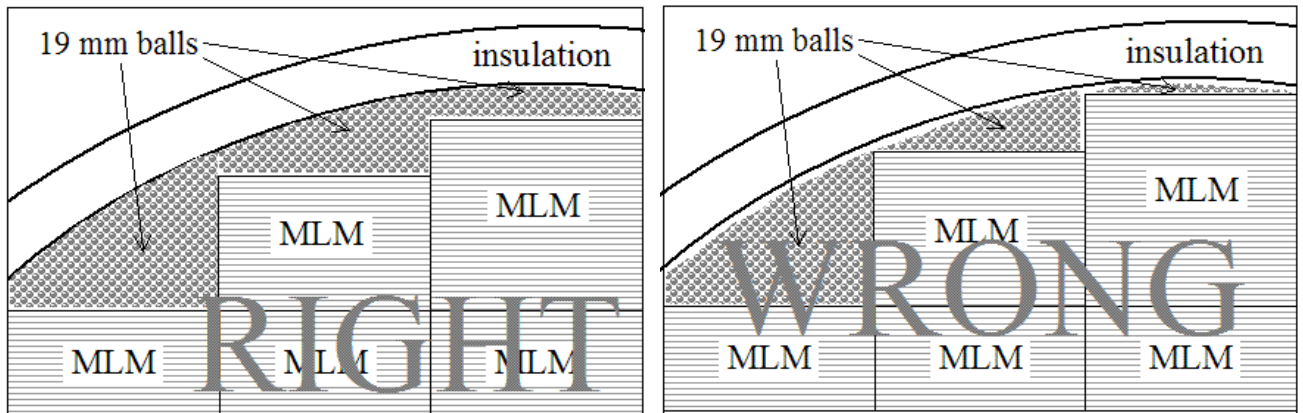
Individual plates can be separated from a module of MLM® by inserting a flat-head screwdriver between the last plate and the next one.

A square module of MLM® can be split into two smaller rectangles by dividing it parallel to the ceramic plates. To do this, place a square MLM® module flat on a table, with the openings facing upward. Align the edge of the table with the point where the cut is to be made. Place a flat screwdriver at mid-height of the adhesive layer on the side of the module.



Tap the screwdriver with a hammer, and the module will split. It may be necessary to tap repeatedly at different heights.

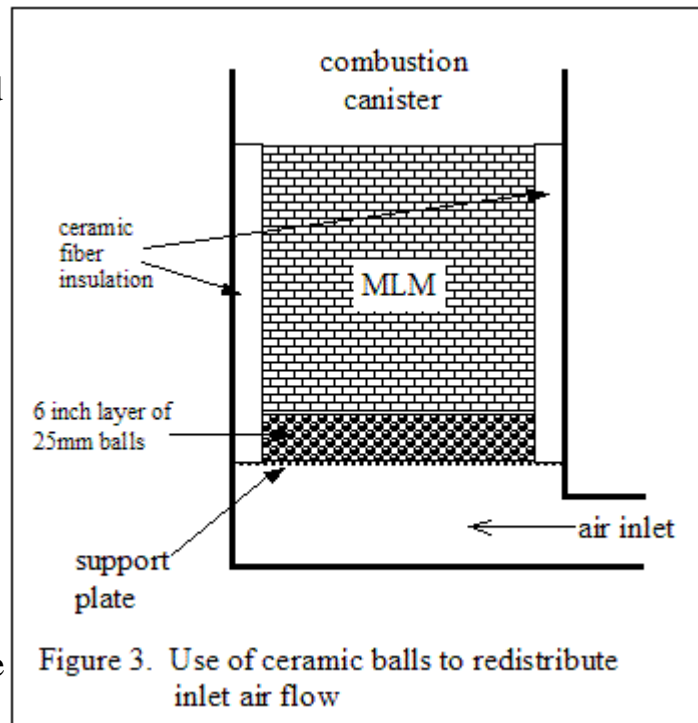
When MLM[®] is installed in canisters with round walls, there will be odd-shaped gaps between the square modules and the insulation layer. Such gaps can be filled with 19-mm ceramic balls before the next layer of MLM[®] is installed. Note, however, that these ceramic balls cannot completely fill very narrow gaps (less than 2 inch wide), so MLM[®] modules should not be placed so close to the insulation layer that a gap can't be filled.



8. Air Flow Distribution

If the air flowing into the ceramic media makes a sharp turn at the entrance to the packed section, measures must be taken to ensure uniform air flow through all parts of the media. If more air flows through the back half of the bed (opposite the inlet) than the front half, heat recovery will be impaired.

A gradual inlet transition which causes the air to flow vertically before entering the media is the best way to ensure uniform air flow. If there is not enough space for a gradual transition, the installation of vanes may help to



even out the flow pattern after a sharp turn. Laboratory tests have indicated that a 6-inch layer of 25-mm ceramic balls placed between the MLM[®] and the air inlet can go a long way toward evening the flow pattern.

9. Plugging Considerations

If there is particulate matter (dust) in the air stream, MLM[®] is far more resistant to plugging than either 1 or 1½ inch saddles.

If ceramic balls or saddles are used for air redistribution they will have more of a tendency to plug than the MLM[®] does. If random media are placed on top of MLM[®], they will be much easier to remove in case they do plug. If the dust load is substantial, it may be necessary to clean the balls periodically. In cases like this the balls act filter media as well as an air redistributor.

10. Start Up

In order to minimize thermal shock and avoid cracking of the media when the RTO is cold started, the ramp-up time to reach a temperature of 1,600 °F should be at least 90 minutes. An oxidizer can be re-started in less time if the media has not become completely cold.