

The New and Unique Compact Recycler MPC4000 for all types and sizes of lamps

Balcan has always believed that for any waste lamp recycling system to be both economically and environmentally efficient, lamps need to be pre-crushed before transportation. This is because vehicles can then carry nearly five times more lamps than if they remain whole (a particularly important factor when lamps need to be transported over long distances). Precrushing also overcomes the recognised hazards of the fugitive escape of mercury vapour when lamps break during transportation.

Therefore, Balcan plants have been designed to be as versatile as possible and capable of accepting all kinds and sizes of both whole and pre-crushed lamps. As a result the plant produces very clean glass cullet from the rest of the lamp debris together with a high level of retrieval of mercury bearing phosphor powder. Our crushers can be mounted on static locations or fitted in vehicles used to collect them.

The design of our original model of Recycler (which we have been operating ourselves since 2001) was based on this concept. The merit of this was duly recognised in the citation when we won the Queen's Award for Enterprise in 2006.

Recognising there is an increasing interest in environmental matters from countries with a lesser number and intensity of lamps, we have developed and produced a smaller, more compact and less expensive version of our recycling plant. This new model is called the **MPC 4000**.



Loading of the Recycler is by means of the hydraulically operated stainless steel loader mounted on the front which accepts either 210 litre drums or loose debris. This photograph was taken whilst in actual use within Balcan

The Recycler comprises of four main sections:-

- 1) **The Electrical Control Cabinet** from which the whole plant is operated.
- 2) **The Dual Separator Unit**, the first section of which initially breaks down the lamps fed into it with the second section completing the final separation of the components and producing very clean glass cullet.
- 3) **The Dust Removal Filter** which draws off the mercury bearing dusty phosphor powder down to five micron size. This also ensures that the whole plant operates under negative pressure so dust and vapour does not escape into the workplace. We use a large Filter Unit, modified to fit over a 210 litre drum into which the powder falls and is collected.
- 4) **The Activated Carbon Stack** which is used to remove exceptionally fine dust below 5 microns and mercury bearing vapour (that cannot be removed from the air in any other way) before release to the outside atmosphere.

Total power consumption 12KW / hour



This shows the other end of one of the two Separators from where the metal and plastic components are discharged and collected. Two of these are used in parallel.

It should be noted we prefer to use large capacity Filter and Carbon Stack Units because they do not require to have their media replaced so frequently - which we believe is always inconvenient and more expensive! The cartridge for the Main Dust Removal Filter (No 4) should last for about 2-3 million lamps and for the Main Activated Carbon Stack for about 5 million lamps or even more! This ensures the average cost of filtration for each lamp processed can be less than 1.00p - about 0.75p - which is remarkably low!

RE: OPERATION

In use, lamps are fed into the hydraulically operated stainless steel loader mounted on the front of the Dual Separator. This is capable of accepting 210 litre sizes of drums of debris or debris fed directly into it in any other way. It will also accept most other kinds and sizes of whole lamps, except linear fluorescent tubes over 60cms in length (which should be precrushed). When sufficiently filled, and the loader door closed, it is then raised to empty its contents into the rotating drum of the separator. This in itself causes the debris to be further reduced in size and for the phosphor powder to dust up so it can be drawn off by the negative pressure of the Dust Removal Filter (into containers provided by client). Individual materials are collected at the ends of the Dual Separator Unit.

The resultant debris will depend upon the materials fed in at the beginning. Feeding one type of lamp at a time, such as fluorescent tubes, will produce glass cullet and just one type of component, such as plain aluminium end caps. But feeding a mixture of lamp debris made up from modern lamps, such as energy saving lamps, which contain a high proportion of plastic components as well as metal pieces will produce a similar mixture of materials but free of glass! It is for the client to collect this in any desired way.

RE: CAPACITY

When operated in the recommended way it is our experience it is possible to process the equivalent of 7 - 8 drums of lamp debris per hour. As we consider each drum can hold about 125 - 140 kgs of debris - the equivalent of 600 x 120cm fluorescent tubes, this equates to 38,400 lamps per 8-hour shift!

The Dust Removal Filter Unit requires a constant supply of compressed air of 3.6 cubic metres/hr @ 75 -80psi.



Examples of the type and condition of the metal and plastic debris separated from the glass of the waste lamps.

RE: VENTILATION

We have found that cross ventilation of the room in which the plant operates is superior to downward ventilation and allows employees to work without the need to wear breathing apparatus - only normal PPE.

RE: TREATMENT OF THE PHOSPHOR POWDER FOR THE DISTILLATION OF MERCURY

We are developing our own design of such equipment and expect to have it available by July this year. We would suggest that until this becomes available you should store the powder you produce in the drums you collect from under the Main Filter Unit. We retrieve 1 x 210 litre drum of powder for an average of 30 - 40 drums of debris processed.



A typical drum of mixed modern types of lamps awaiting processing.
(The lid was removed to allow the photograph to be taken)



After going through the Balcan Recycler MPC4000 the clean glass cullet is not so sharp so can be handled with care.

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