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論文名稱(中) 電子產業靜電防制器效能之評估研究

論文名稱(英) Evaluate Study on Electrostatic Control Efficiency in Electronics Industry

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關鍵字(中) 靜電放電
靜電消除器

關鍵字(英) Electrostatic Discharge
Ionizer

摘要(中) 本論文主要是針對靜電放電的防制與靜電消除器的效能確認兩大部分來探討。在靜電放電的防制方面，靜電之各種消除方法中，最經濟有效的方法為接地，所有的導體接地能夠有效克服靜電產生的問題。但是在所有的電子產業中，往往有許多非導體或是絕緣體的設備或是材質，此時就必須考慮使用抗靜電材質或是利用靜電消除器來消散或中和消除降低靜電充電量。

在靜電消除器的效能確認方面，我們針對電子產業操作環境中兩種常用的靜電消除器（Overhead 及 Pulsed DC Emitter），依據國際 ESDA 協會 ANSI ESD STM3.1-2000 之標準測試方法為基礎進行測試。本研究所利用標準的測試儀器為充電金屬板顯示器（Charge Plant Monitor, CPM）以進行靜電消除器有效擴散之量測、高度變化性能、風速變化性能之測試研究。

研究結果顯示，Overhead 靜電消除器於風速最大時效果最好，在靜電消除器下方 30cm 之平面其 Discharge Time 有效範圍幾乎只有在靜電消除器正下方的面積。而在 90cm~120cm 的平面上，其有效範圍幾乎一樣，約為 1.8m（寬）ㄨ 1.2m（深）之面積。另外 Pulsed DC Emitter 靜電消除器，在 90cm~120cm 之平面其 Discharge Time 有效範圍幾乎一樣，正、負離子皆有效之涵蓋範圍則其面積約為 1.2m（寬）ㄨ 1.8（深）。

摘要(英) This thesis is a study on the control and the performance design of Ionizers of Electrostatic Discharge (ESD) systems. On the aspects of ESD control, grounding is most effective economically in eliminating static charge. The grounding of all the conductors can solve the static charge problems. But for non-conductors or insulation of equipment and materials in electronics industry, static charge cannot be solved only using grounding. Then one has to consider the use of anti-static materials, or use Ionizers to dissipative static charge or to reduce to neutral charge level.

Two types of Ionizers have to be separately studied for their performance of in static discharge. These two types are namely the Overhead and the Pulsed DC Emitter, commonly used in electronics industry. Laboratory tests are conducted according to ANSI ESD STM3.1-2000 standard test method. A standard test instrument Charge Plant Monitor (CPM) is used study the performance of the effective static charge diffusion. Different heights and velocities are tested for the performance of Ionizers.

The research revealed that Overhead Ionizer got remarkable effect at the maximum velocity where Ionizer almost got the same discharge time with effective area below the plane of 30 cm and directly down point but we got the same discharge time with the same effective area on the plane of 90 to 120 cm where its effective area is about 1.8m(W) ㄨ 1.2m(D). Apart from above, Pulsed DC Emitter Ionizer got almost the same effective area with the same discharge time below its 90 to 120 cm where its positive and negative ions encompass area around 1.2m(W) ㄨ 1.8m(D).

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