

膠水應用於 3C 產品之模擬

Liquid glue simulation application for 3C products

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摘要

近年來由於筆記型與一體機電腦(AIO)日趨輕薄及窄邊框設計,使得螢幕以及機構件貼合面積急遽縮減,傳統膠帶強度有其極限,導致膠帶無法承受高低溫環測以及外力作用而脫膠。然而,膠水其黏性皆比膠帶好,可以達到極窄邊框設計,於本研究根據ASTM測試規範取得膠水基礎參數,並利用ABAQUS中的膠合元素進行模擬初步驗證其可信度。接下來,將驗證過後的材料代入整機進行高低溫環測模擬,預測膠水脫膠現象。

關鍵字: 膠合元素

ABSTRACT

In these few years, the narrow border and slim design had been often requested for notebook and AIO. Less and less adhesive area is allowed in the area of screen and bezel structure. The strength of traditional tape has limited and it might get peeled off after high/low temperature test (HTHH) or load bearing test. However, the adhesive property of liquid glue is better than tape and narrow boarder design can be reached. All of liquid glue material properties in this research obtained is based on the ASTM standard test rules. Cohesive element from ABAQUS and simplified CAE model are used as basic data to calibrate with test results. After that, the HTHH & loading simulation based on the basic data is used in whole system assembly of a product to check peeling-off phenomenon.

Keywords: cohesive element

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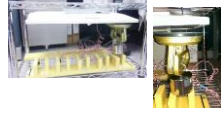
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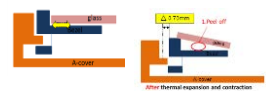
Previous Study

Glass peel off from bezel after static holding test or storage test.

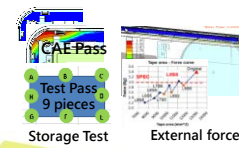
Static holding test



Thermal cycle test



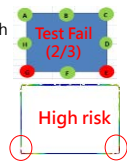
Tape Simulation



Narrow border design

It is very difficult to pass test if tape width is less than 3mm.

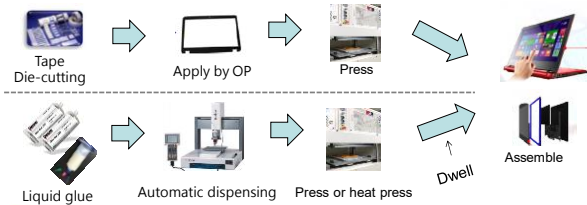
≤3mm



Narrow border design : Liquid Glue

- Liquid glue requirement (touch glass / bezel)
 - High strength , Excellent environment resistance, Re-workable

Process

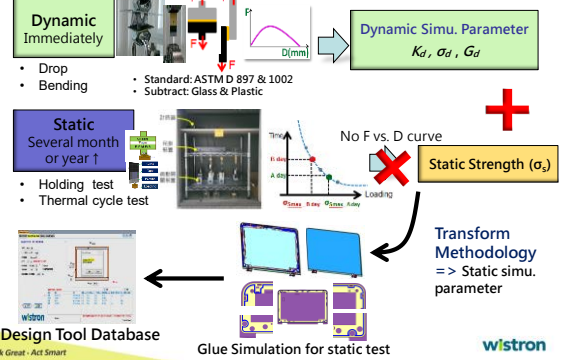


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Narrow border design : Liquid Glue

Study Process



Design Tool Database

Glue Simulation for static test

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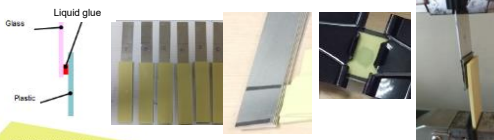
Narrow border design : Liquid Glue

Basic test

Dynamic normal test



Dynamic shear Test



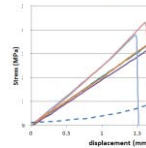
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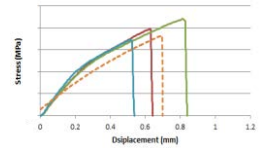
Narrow border design : Liquid Glue

Basic test data

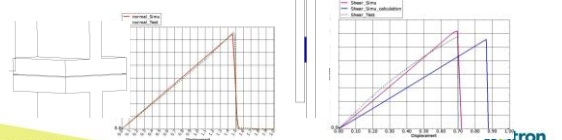
Dynamic Normal Strength



Dynamic Shear Strength



Test VS. CAE



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