

# **Cypress Semiconductor Indirect Material Qualification Report**

**QTP# 053406 VERSION 1.0  
November 2005**

**Bonedog Design  
(Alternative Chip Tray Supplier)**

## **CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:**

Fredrick Whitwer  
Principal Reliability Engineer  
(408) 943-2722

Sabbas Daniel  
Quality Engineering Director  
(408) 943-2685

**INDIRECT MATERIAL QUALIFICATION HISTORY**

<b>QUAL MEMO</b>		<b>DESCRIPTION OF QUALIFICATION PURPOSE</b>	<b>DATE COMP.</b>
053406		Bonedog Design (Alternative Chip Tray Supplier)	Oct 05

<b>MAJOR MATERIAL INFORMATION USED IN THIS QUALIFICATION</b>	
<b>MATERIAL IDENTIFICATION</b>	
<b>Material Designation:</b>	Die Sales Chip Tray
<b>Chip Tray Part No:</b>	H20-100X140-22 / H20-140X190-22
<b>Surface Resistivity:</b>	10E5.2-11/sq / 10E10.2/sq
<b>Material Name:</b>	Permanent Antistatic ABS
<b>Chemical Name:</b>	Acrylonitrile-Butadine-Styrene Copolymer
<b>Content:</b>	>55%
<b>Formula:</b>	(C <sub>3</sub> H <sub>3</sub> N, C <sub>4</sub> H <sub>6</sub> , C <sub>8</sub> H <sub>8</sub> ) <sub>x</sub>
<b>CAS no.:</b>	9003-56-9
<b>Impurities contributing to Hazards:</b>	None
<b>PHYSICAL DATA</b>	
<b>Appearance:</b>	White pellet
<b>Melting Temperature:</b>	Softening above 85-91 deg
<b>Solubility:</b>	Insoluble in water
<b>Specific Gravity:</b>	1.06g/cm <sup>3</sup>
<b>STABILITY AND REACTIVITY</b>	
<b>Flammability:</b>	YES
<b>Flash point:</b>	404°C
<b>Auto-ignition Temperature:</b>	466°C
<b>Reactivity with wafer:</b>	NO
<b>Stability:</b>	Stable as non-reactive under normal handling and storage condition
<b>Dust Explosion:</b>	Possible if powder exists
<b>Thermal Decomposition Gases</b>	CO, HCN, AN SM and NO
<b>TOXICOLOGICAL INFORMATION</b>	
<b>Irritation irritant to:</b>	Fumes or vapors generated from decomposing resin may be irritant to eyes
<b>Acute oral toxicity (LD50):</b>	Not determined
<b>Mutagenicity</b>	Not determined
<b>ECOLOGICAL INFORMATION</b>	
	To avoid being taken by ocean species or birds, disposal of the waste to the ocean and water sources is inhibited
<b>HAZARD IDENTIFICATION</b>	
<b>Most Important Hazards:</b>	None
<b>Adverse Human Health Effects</b>	None
<b>Environmental Effects</b>	None
<b>Physical and Chemical Hazards</b>	None

<b>MAJOR MATERIAL INFORMATION USED IN THIS QUALIFICATION</b>	
<b>FIRST AID MEASURES</b>	
<b>Inhalation</b>	In case of gases evolving from melting resin, move subject to fresh air. Treat symptomatically.
<b>Skin Contact</b>	In case of pellets or powder, wash with water. In case of melt, wash affected skin area and clothing with plenty of (soap and) water. Seek medical advice.
<b>Eye Contact</b>	In case of pellets or powder, flush with plenty of water at least 15 minutes. Seek medical advice if any dust particles still remains. In case of gases evolving from melted resin of high temperature, flush with plenty of water for at least 15 minutes. Seek medical if necessary.
<b>Ingestion</b>	Induce vomiting. Rinse mouth with water. Seek medical advice if necessary.
<b>FIRE-FIGHTING MEASURES</b>	
<b>Extinguishing Media</b>	Water, Foam, Dry chemical powder
<b>Special Fire-Fighting Procedure</b>	Self contained breathing apparatus
<b>Fire and Explosion Hazards</b>	None
<b>ACCIDENTAL RELEASE MEASURES</b>	
<b>Methods for Cleaning up</b>	Recovery if not contaminated or Disposal
<b>Personal Precautions</b>	Pellets or powder remained on ground may cause slipping.
<b>Environmental precautions</b>	Gather pellets and powder thoroughly to avoid birds and fishes taking from draining water
<b>HANDLING AND STORAGE</b>	
<b>Handling</b>	Prevent from fire around handling area. Maintain good housekeeping standards to prevent accumulation of dust. To avoid dust explosion resulting from the existence of powder, electrostatics eliminators and grounding should be fixed to such equipment as air transferring pipes, bag filters and hoppers. Use electrically conductive filters for bag filters.
<b>Storage</b>	Keep the materials at a cool dry place. Protect from direct sunlight, rain and violet temperature fluctuation. Fire is inhibited around storage area.
<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>	
<b>Ventilation</b>	Necessary to exclude dust, fumes and gases
<b>Personal Protection</b>	EYE- Wear safety glasses for general purpose. Wear chemical goggles for cleaning molding machines. RESPIRATORY- Wear masks for cleaning molding machines. GLOVES- necessary for handling melted resin.
<b>DISPOSAL CONSIDERATIONS</b>	
	Controlled incineration or landfill according to local, state or national laws and regulations concerning health and pollution. Inadequate incineration may generate toxic gases such as CO, HCN, AN and SM.

**PROCESS ENGINEERING QUALIFICATION PERFORMED PER SPECIFICATION REQUIREMENTS**

<b>Test</b>	<b>Test Condition (Reference Specifications)</b>	<b>Result P/F</b>
CADFIT Analysis	Cypress Spec. 22-00113	P
Substance Check	Cypress Spec. 52-10001	P
Dimensional Measurement	Cypress Spec. 22-00113 Cypress Spec. 001-04047	P
Surface Resistivity Measurement	Cypress Spec. 22-00113 Cypress Spec. 03-00029	P
Functionality Test	Cypress Spec. 22-00113	P
Warp Test	Cypress Spec. 22-00113	P
Drop Test	Cypress Spec. 22-00113	P

## Qualification Data

QTP#: 053406

### CADFIT ANALYSIS – Refer to Attachment 1

#### All Parts Depth: 22-mils

	<i>min</i>	<i>max</i>	<i>gap</i>
7-mils acceptance	20.1	21.9	15.3
	<i>min</i>	<i>max</i>	<i>gap</i>
14-mils acceptance	20.55	21.45	7.7

#### Package X Part

	<b>H20-100X140-22</b>		<b>H20-140X190-22</b>	
	<i>nominal</i>		<i>nominal</i>	
TRAY	100		140	
	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>
PACKAGE	65	96	91	133

#### Package Y Part

	<b>H20-100X140-22</b>		<b>H20-140X190-22</b>	
	<i>nominal</i>		<i>nominal</i>	
TRAY	140		190	
	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>
PACKAGE	90	125	155	165

### DIMENSIONAL MEASUREMENT (mm) – Refer to Attachment 1

### MSDS and CoC – Refer to Attachment 2

### SURFACE RESISTIVITY (ohms/sq unit – Refer to Attachment 3)

### FUNCTIONALITY TEST (Passed)

### MATERIAL COMPARISON AND FAILURE RATE (Refer to Attachment 4)

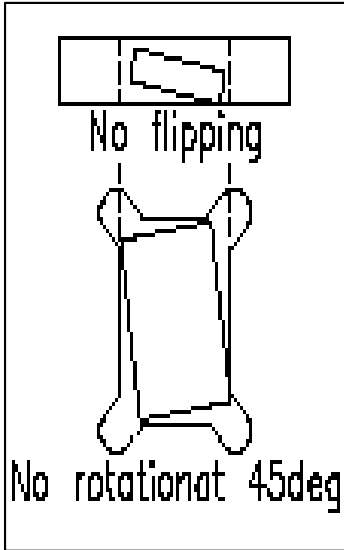
### DROP TEST (Refer to Attachment 5)

## ATTACHMENTS

### ATTACHMENT 1: CADFIT ANALYSIS AND DIMENTIONAL MEASUREMENT

**DESIGN RULE**

**ROTATION:**



**DEPTH:**

Highest thickness: 13.7-14.3

- Must not be < 1.5X

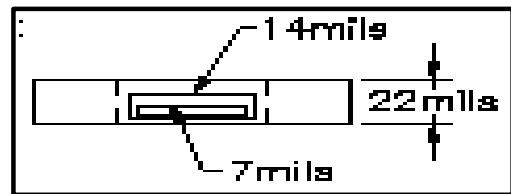
Lowest thickness: 6.7-7.3

- Must not be >3X

Depth	Die Thickness		Remarks
	7mils	14mils	
18	NOT OK	NOT OK	Thrown Dice
24	NOT OK	OK	Flipping
70	NOT OK	NOT OK	Too Deep
22	OK	OK	No Quality Issue

	MIN	MAX	MIN	MAX
	1.5		3	
6.7-7.3	18.85	18.85	20.1	21.9
13.7-14.3	20.55	21.45	21.45	22.3

Cancelled    Too shallow for 14mils/too deep for 7mils  
 Accepted    No flipping neither 7mils nor 14mils



**Side to Side:**

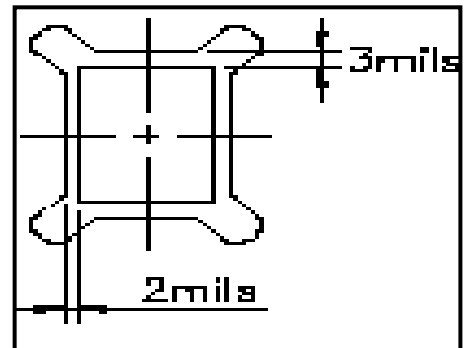
X-axis: minimum of 6 mils

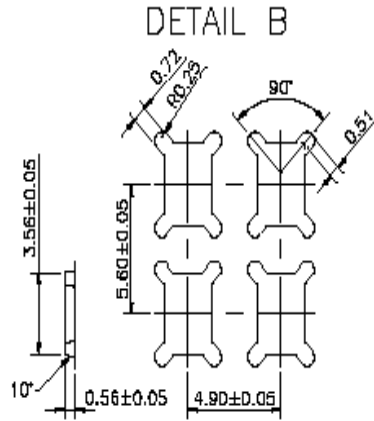
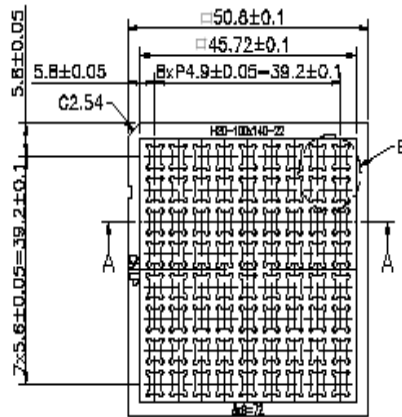
- 3 mils each side

Y-axis: minimum of 4 mils

- 2 mils each side

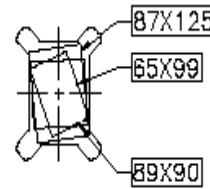
Max side to side: as long as no theta rotation of 45 deg



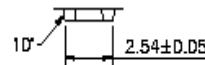
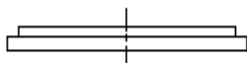
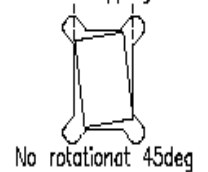


NOTES:

- (1) "E" Ejector pin position.  
The eject hold can't exceed over the tray bottom surface.
- (2) Warpage Spec ; Max. 0.1mm
- (3) Unspecified dim's tolerance : ±0.10mm
- (4) Tray color code: Black
- (5) Notch code : 2

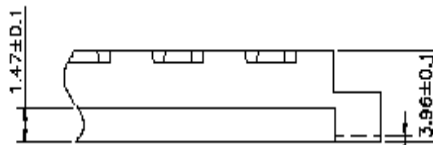
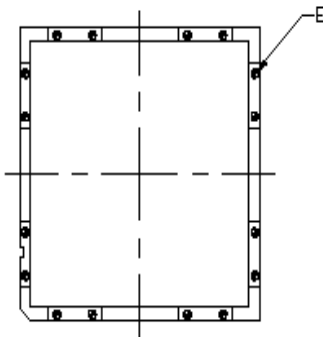
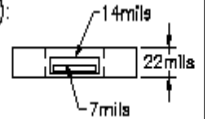


Rotation:



Depth:

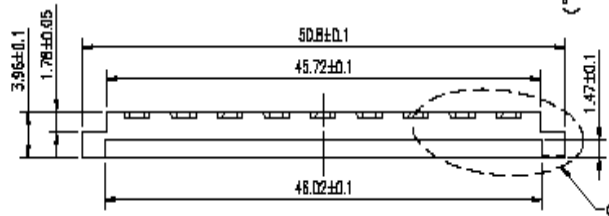
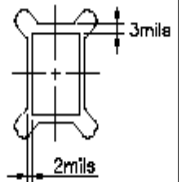
highest thickness (13.7-14.3):  
 -must not be < 1.5X  
 lowest thickness (6.7-7.3):  
 -must not be > 3X



DETAIL C

Side to Side:

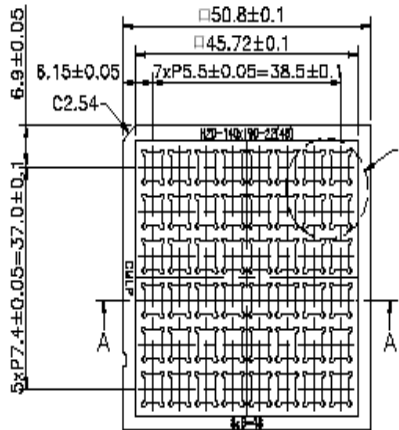
x-axis : minimum of 8 mils  
 -4mils each side  
 y-axis : minimum of 8 mils  
 -4mils each side  
 Max side to side : as long as  
 no theta rotation of 45deg



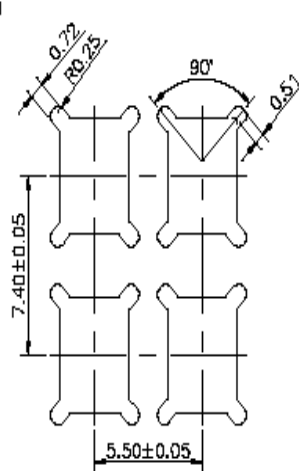
SECTION A-A

NICHING INDUSTRIAL CORPORATION 利機企業股份有限公司	REVISION	APPROVAL	DATE	DESIGNED BY	CHECKED BY	LIMIT	MM	TITLE	MOLD No.	SHEET No.
					T.P.L			H20-100x140-22		A7
				DRAWN BY	APPROVED BY	SCALE	1:1		FILE No.	
				L.B.T	T.P.L	DATE	2005.09.06		7CB3413	





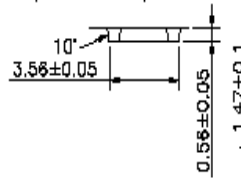
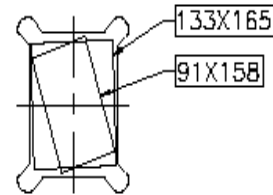
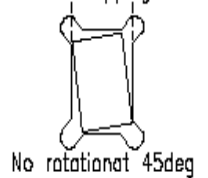
DETAIL B



NOTES:

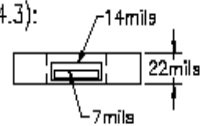
- (1) "E" Ejector pin position.  
The eject hold can't exceed over the tray bottom surface.
- (2) Warpage Spec : Max. 0.1mm
- (3) Unspecified dim's tolerance : ±0.10mm
- (4) Tray color code: Black
- (5) Surface Resistance :  $10^9 \sim 10^{11} \Omega$
- (6) Pocket size : 3.56x4.83x0.56mm
- (7) Notch code : 6

Rotation:

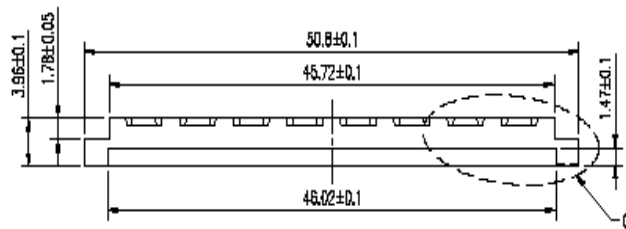


Depth:

highest thickness (13.7-14.3):  
-must not be < 1.5X  
lowest thickness (6.7-7.3):  
-must not be > 3X



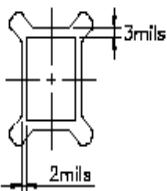
DETAIL C



SECTION A-A

Side to Side:

x-axis : minimum of 8 mils  
-4mils each side  
y-axis : minimum of 8 mils  
-4mils each side  
Max side to side : as long as  
no theta rotation of 45deg



NICHING INDUSTRIAL CORPORATION  
利機企業股份有限公司

REVISION	APPROVAL	DATE	DESIGNED BY	CHECKED BY	UNIT	TITLE	MOLD No.	SHEET No.
				T.P.L	mm	H20-140x190-22(48)		
			DRAWN BY	APPROVED BY	SCALE		FILE No.	A2
			L.B.T	T.P.L	1 : 1			
					DATE	2005.09.06		

## ATTACHMENT 2 – MSDS and CoC

### MATERIAL SAFETY DATA SHEET

**Product Name:** Permanent Antistatic ABS

#### 1. COMPANY IDENTIFICATION

Company: Chi Lin Technology Co., Ltd.  
Address: No.71, Te Lun Rd., Jen Te Hsiang, Tainan County, Taiwan, R.O.C.  
Information Phone No: 886-6-2794113 Ext.232 (Market & Business Development)  
Emergency Phone No: 886-6-2794113 Ext.232 (Market & Business Development)  
Fax No. 886-6-2791194

#### 2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	ABS (Acrylonitrile-Butadiene-Styrene Copolymer)	Other Additives
Content	>55%	<45%
Formula	$(C_3H_3N, C_4H_6, C_8H_8)_x$	Various
CAS No.	9003-56-9	Various
Impurities contributing to Hazard	None	None

#### 3. HAZARD IDENTIFICATION

Most Important Hazards None  
Adverse Human Health Effects None  
Environmental Effects None  
Physical and Chemical Hazards None

#### 4. FIRST AID MEASURES

Inhalation In case of gases evolving from melted resin, move subject to fresh air.  
Treat symptomatically.  
Skin Contact In case of pellets or powder, wash with water.  
In case of melt, wash affected skin area and clothing with plenty of (soap and) water.  
Seek medical advice.  
Eye Contact In case of pellets or powder, flush with plenty of water for at least 15 minutes.  
Seek medical advice if any dust particles still remain.  
In case of gases evolving from melted resin of high temperature, flush with plenty of water for at least 15 minutes. Seek medical advice if necessary.  
Ingestion Induce vomiting. Rinse mouth with water. Seek medical advice if necessary.

#### 5. FIRE-FIGHTING MEASURES

Extinguishing Media Water, Foam, Dry chemical powder  
Special Fire-Fighting Procedure Self contained breathing apparatus  
Fire and Explosion Hazards None

#### 6. ACCIDENTAL RELEASE MEASURES

Methods for Cleaning up Recovery if not contaminated or Disposal  
Personal Precautions Pellets or powder remained on ground may cause slipping  
Environmental Precautions Gather pellets and powder thoroughly to avoid birds or fishes taking from draining

## 7. HANDLING AND STORAGE

Handling Prevent from fire around handling area. Maintain good housekeeping standards to prevent accumulation of dust. To avoid dust explosion resulting from the existence of powder, electrostatics eliminators and grounding should be fixed to such equipment as air transferring pipes, bag filters and hoppers. Use electrically conductive filters for bag filters.

Storage Keep the materials at a cool dry place. Protect from direct sunlight, rain and violent temperature fluctuation. Fire is inhibited around storage area.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Threshold Limit Value		Not determined
Ventilation		Necessary to exclude dust, fumes and gases.
Personal Protection	Eye	Wear safety glasses for general purpose. Wear chemical goggles for cleaning molding machines.
	Respiratory	Wear masks for cleaning molding machines.
	Gloves	Necessary for handling melted resin.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	white pellet
Melting Temperature	softening above 85~91.
Solubility	Insoluble in water
Specific Gravity	1.06g/cm <sup>3</sup>

## 10. STABILITY AND REACTIVITY

Flammability	Yes
Flash Point	404.
Auto-ignition Temperature	466.
Reactivity with Water	No
Stability	Stable and non-reactive under normal handling and storage condition.
Dust Explosion	Possible if powder exists.
Thermal Decomposition Gases	CO, HCN, AN, SM and NO.

## 11. TOXICOLOGICAL INFORMATION

Irritation	Fumes or vapors generated from decomposing resin may be irritant to eyes.
Acute oral toxicity (LD50)	Not determined
Mutagenicity	Not determined

## 12. ECOLOGICAL INFORMATION

To avoid being taken by ocean species or birds, disposal of the waste to the ocean and water sources is inhibited.

## 13. DISPOSAL CONSIDERATIONS

Controlled incineration or landfill according to local, state or national laws and regulations concerning health and pollution. Inadequate incineration may generate toxic gases such as CO, HCN, AN, and SM.

## **CoC TEST REPORT OF H20-100x140-22**

**Part Number:** H20-100x140-22

**Pocket size:** 100 mil x 140 mil x 22 mil depth  
2.54 mm x 3.56 mm x 0.56 mm

**Period of manufacturing:** From 14-3-2005 till 28-3-2005

**Date of shipment:** On 29-3-2005

**Date of QC inspection:** On 28-3-2005

**Number of piece shipped:** 100 pieces

**Number of samples:** 20

**Number of measured samples:** 3

**Lot Number:** 050328B

**Dimension number:** 9, 5 and 13 is the width, length and depth respectively

### **Results**

- 1) All dimensions are within the specification
- 2) No visual defects such as burr, deformation, crack, impurities, hair line crack, black spot, scratch, oil, bright spot, incomplete molding, shrinkage, pocket entry spot burr, pocket orientation, falling dust, and different color
- 3) Resistance value  
10 To the power of 10 and it is within the specification of 10 to the power of 12
- 4) Twist and deform test  
Passed

## **CoC TEST REPORT OF H20-140x190-22**

**Part Number:** H20-140x190-22

**Pocket size:** 140mil x 190 mil x 22-mil depth  
3.56 mm x 4.83 mm x 0.56 mm

**Period of manufacturing:** From 1-4-2005 till 13-4-2005

**Date of shipment:** On 13-4-2005

**Date of QC inspection:** On 13-4-2005

**Number of piece shipped:** 100 pieces

**Number of samples:** 20

**Number of measured samples:** 3

**Lot Number:** 050328B

**Dimension number:** 9, 5 and 13 is the width, length and depth respectively

### **Results:**

- 1) All dimensions are within the specification
- 2) No visual defects such as burr, deformation, crack, impurities, hair line crack, black spot, scratch, oil, bright spot, incomplete molding, shrinkage, pocket entry spot burr, pocket orientation, falling dust, and different color
- 3) Resistance value  
10 To the power of 10 and it is within the specification of 10 to the power of 12
- 4) Twist and deform test  
Passed

**ATTACHMENT 3: MEASURED SURFACE RESISTIVITY, STATIC CHARGE AND TRIBO ELECTRIC CHARGE OF BONE DOG TRAYS**

**H20-140x190-22 (48)**

**Surface Resistivity:** 10E10.2 per. sq.

**Static Charge:** .01 V

**Tribo-Charge:** .01 V



**H20-100X190-22**

**Surface Resistivity:** 10E10 per. sq

**Static Charge:** .00 V

**Tribo-Charge:** .01 V



**H20-090130**

**Surface Resistivity:** 10E5 per. sq

**Static Charge:** .00 V

**Tribo-Charge:** .01 V



**H20-140190**

**Surface Resistivity:** 10E5.2 per. sq

**Static Charge:** .00 V

**Tribo-Charge:** .01 V



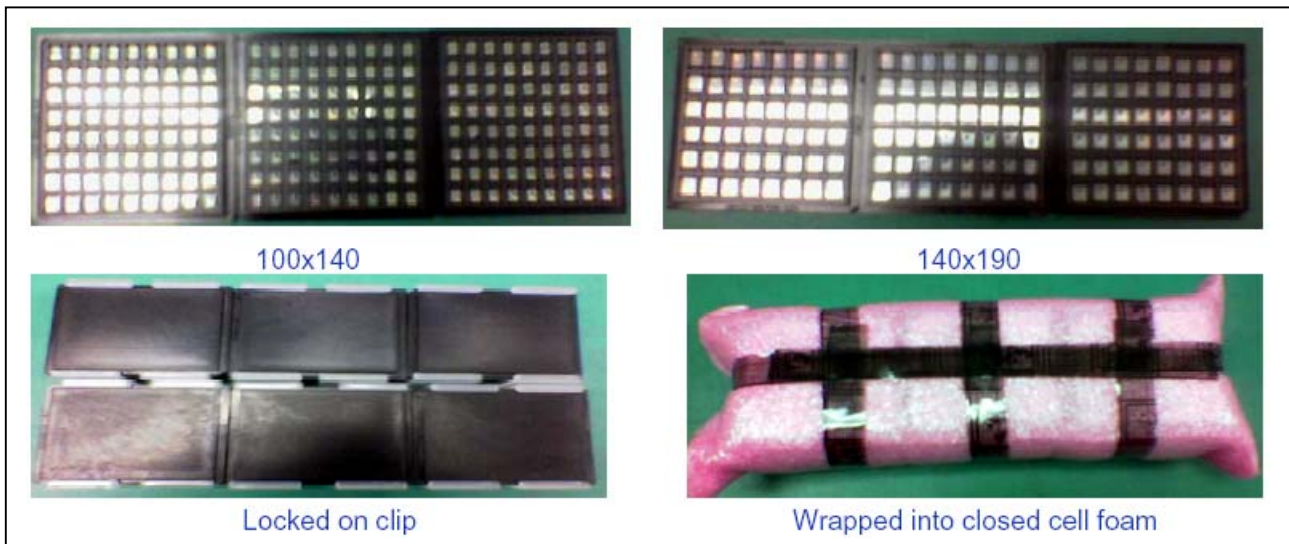
**Static Dissipative Materials** 10E5 to 10E12 per sq.



**ATTACHMENT 5: DROP TEST**

**REQUIREMENTS:**

- 1) Drop test at 5 Ft Height
- 2) 4 sides
- 3) 4 corners
- 4) Top and bottom





**RESULTS:**

<b>Tray</b>	<b>Quantity</b>	<b>Die Chipping</b>	<b>Die Crack</b>	<b>Die Backside</b>	<b>Scratches</b>
<b>1</b>	72	0/72	0/72	0/72	0/72
<b>2</b>	72	0/72	0/72	0/72	0/72
<b>3</b>	65	0/65	0/65	0/65	0/65
<b>4</b>	72	0/72	0/72	0/72	0/72
<b>5</b>	72	0/72	0/72	0/72	0/72
<b>6</b>	72	0/72	0/72	0/72	0/72
<b>7</b>	72	0/72	0/72	0/72	0/72
<b>8</b>	72	0/72	0/72	0/72	0/72
<b>9</b>	72	0/72	0/72	0/72	0/72
<b>Tray</b>	<b>Quantity</b>	<b>Die Chipping</b>	<b>Die Crack</b>	<b>Die Backside</b>	<b>Scratches</b>
<b>1</b>	48	0/48	0/48	0/48	0/48
<b>2</b>	48	0/48	0/48	0/48	0/48
<b>3</b>	48	0/48	0/48	0/48	0/48
<b>4</b>	48	0/48	0/48	0/48	0/48
<b>5</b>	42	0/42	0/42	0/42	0/42
<b>6</b>	48	0/48	0/48	0/48	0/48
<b>7</b>	48	0/48	0/48	0/48	0/48
<b>8</b>	48	0/48	0/48	0/48	0/48
<b>9</b>	48	0/48	0/48	0/48	0/48