

EastRising LCD Panel Quality Criteria



REV	Descriptions	Release Date
1.0	Preliminay Release	Nov-24-2009
2.0	Add more Precaution Items	Jan-15-2012

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1. PURPOSE

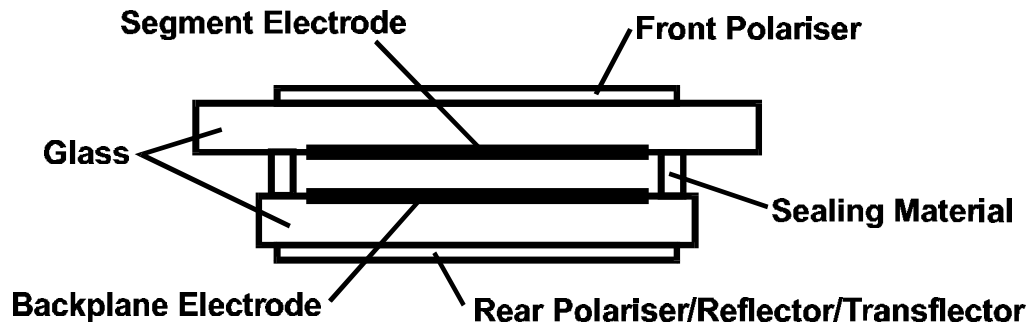
The LCD specification provides outgoing inspection provisions and expected quality levels based on outgoing inspection of LCD.

2. SCOPE

This LCD specification is applicable to all outgoing inspections and quality assurance thereafter.

3. DEFINITION OF TERMS

3.1 LCD TECHNICAL TERMS



3.2 GENERAL TERMS OF PRODUCT QUALITY

3.2.1 FUNCTIONAL DEFECTS

TERMS	DEFINITION
SHORT	Turning on of non-selected segment(s)
OPEN	No operation of segment(s)
HIGH CURRENT	Current consumption higher than specified value
TWIST	Longer response time than specified value
NON-UNIFORM CONTRAST	Varied contrast across panel
PIN HOLE	Missing portion within a segment
EXCESS	Unwanted protrusion of a pattern

3.2.2 VISUAL DEFECTS

TERMS	DEFINITION
LEAKAGE	Absence of liquid crystal in cell
WRONG POLARIZER ATTACHMENT	Incorrect orientation of front and rear polarizers
RAINBOW	Coloration across the viewing area
CHIPS	Glass with missing portions
SCRATCHES	Scratches on polarizer or glass
SPOTS	Foreign particles between glass plates or between glass plate and polarizer
BUBBLES	Bubbles between glass and polarizer

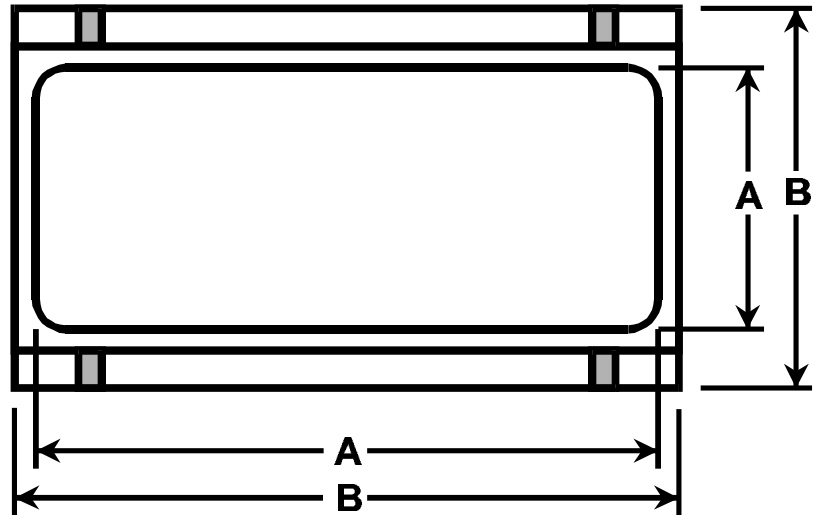
4. OUTGOING INSPECTION PROVISION

4.1 INSPECTION CONDITION

The visual inspection is with unaided eyes at a minimum 30cm under 40W fluorescent light.

VIEWING AREA DEFINITION :

A : Viewing Area
B : Glass Outline



4.2 INSPECTION METHOD

MIL-STD-105D, GENERAL INSPECTION LEVEL II

4.3 DEFECT CLASSIFICATION

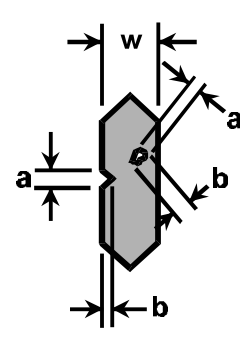
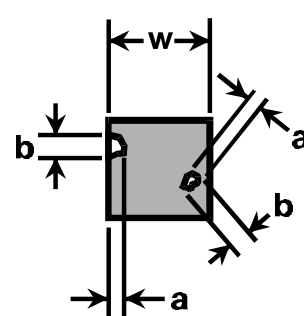
DEFECT	FUNCTION	APPEARANCE
MAJOR	High current, twist, short, open	Leakage, wrong polarizer attachment
MINOR	Others	Others

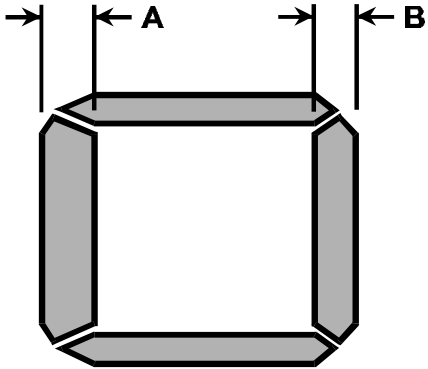
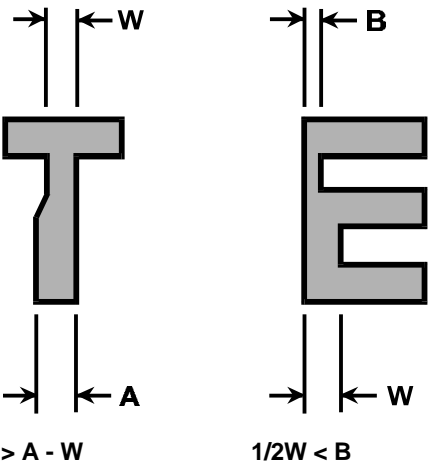
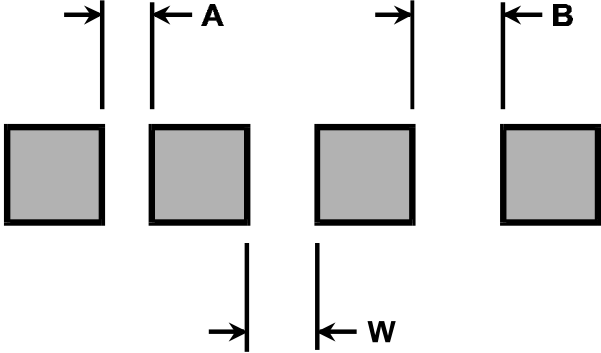
4.4 INSPECTION STANDARD

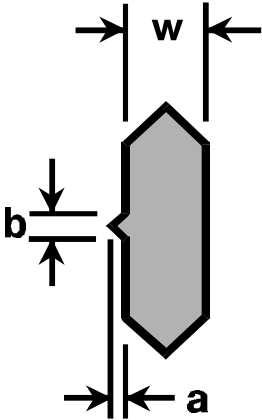
A	CLASSIFICATION	FUNCTION	APPEARANCE
Q	Major defects	1	1
L	Minor defects	2.5	2.5

5. SPECIFICATION FOR QUALITY CHECK

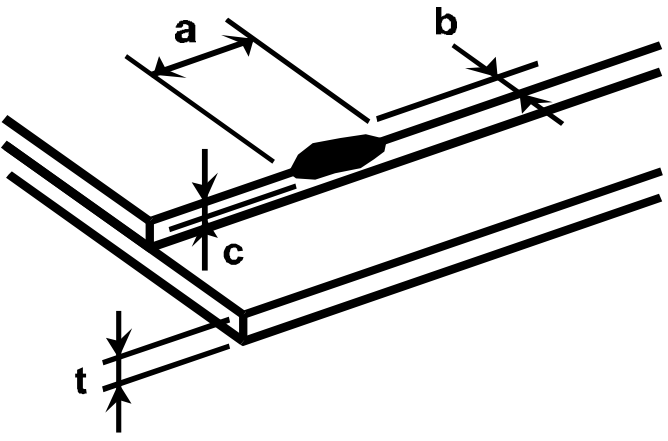
5.1 FUNCTIONAL DEFECTS

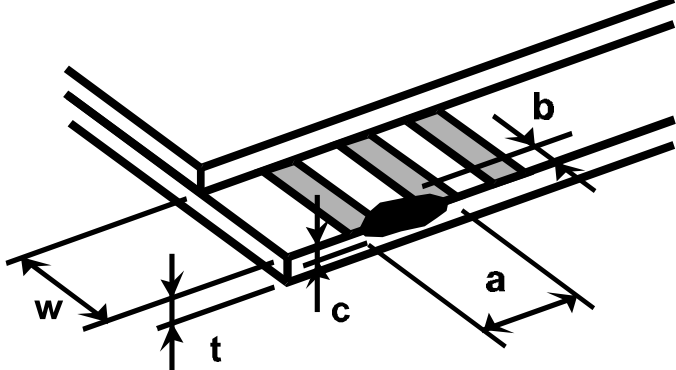
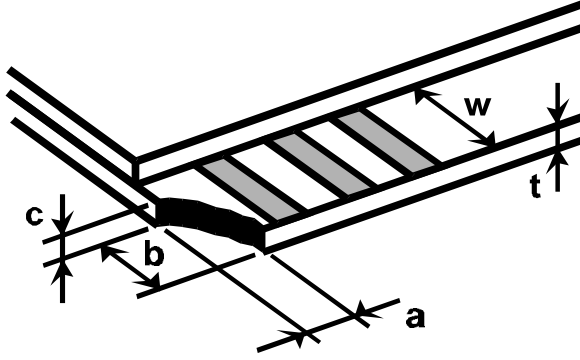
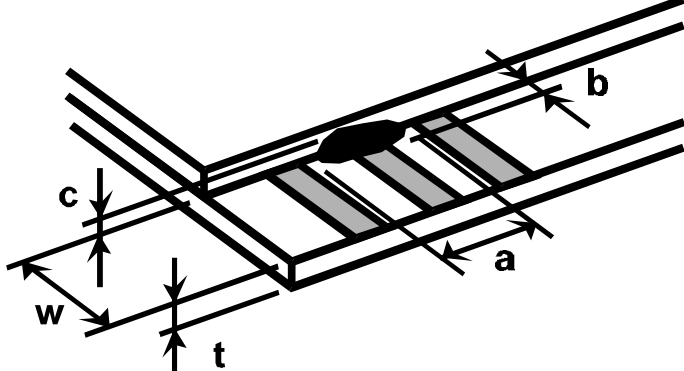
ITEM	DEFECTS	CRITERIA																				
1	SHORT	FAIL																				
2	OPEN	FAIL																				
3	HIGH CURRENT	FAIL																				
4	TWIST	FAIL																				
5	PIN HOLE	<p>a) Segment, Letter</p>  $D = (a + b) / 2$ <table border="1"> <thead> <tr> <th>PATTERN WIDTH</th> <th>SIZE</th> <th>NUMBER PERMITTED</th> </tr> </thead> <tbody> <tr> <td></td> <td>$D < 0.1$</td> <td>IGNORE</td> </tr> <tr> <td>$W > 0.8$</td> <td>$D < 0.2$ AND $D < 1/4W$</td> <td>1</td> </tr> <tr> <td>$W < 0.8$</td> <td>$D < 0.15$ AND $D < 1/3W$</td> <td>1</td> </tr> </tbody> </table> <p>b) Dot Matrix</p>  $D = (a + b) / 2$ <table border="1"> <thead> <tr> <th>SIZE</th> <th>NUMBER PERMITTED</th> </tr> </thead> <tbody> <tr> <td>$D < 0.1$</td> <td>IGNORE</td> </tr> <tr> <td>$D < 0.15$ AND $D < 1/4W$</td> <td>2</td> </tr> <tr> <td>$D > 0.15$</td> <td>0</td> </tr> </tbody> </table>	PATTERN WIDTH	SIZE	NUMBER PERMITTED		$D < 0.1$	IGNORE	$W > 0.8$	$D < 0.2$ AND $D < 1/4W$	1	$W < 0.8$	$D < 0.15$ AND $D < 1/3W$	1	SIZE	NUMBER PERMITTED	$D < 0.1$	IGNORE	$D < 0.15$ AND $D < 1/4W$	2	$D > 0.15$	0
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ITEM	DEFECTS	CRITERIA
6	WIDTH	<p>a) Segment</p>  <p>1) $A - W < 1/4W$ 2) $B - W < 1/4W$ 3) $A - B < 0.2$</p> <p>b) Letter</p>  <p>$1/3W > A - W$ $1/2W < B$</p> <p>c) Dot Matrix</p>  <p>1) $A - W < 1/4W$ 2) $B - W < 1/4W$</p>

ITEM	DEFECTS	CRITERIA												
7	EXCESS	 <table border="1" style="margin-top: 20px;"> <thead> <tr> <th>PATTERN WIDTH</th> <th>SIZE</th> <th>NUMBER PERMITTED</th> </tr> </thead> <tbody> <tr> <td>$W > 0.8$</td> <td>$D < 0.1$</td> <td>IGNORE</td> </tr> <tr> <td>$W < 0.8$</td> <td>$D < 0.2$ AND $D < 1/4W$</td> <td>1</td> </tr> <tr> <td></td> <td>$D < 0.15$ AND $D < 1/3W$</td> <td>1</td> </tr> </tbody> </table>	PATTERN WIDTH	SIZE	NUMBER PERMITTED	$W > 0.8$	$D < 0.1$	IGNORE	$W < 0.8$	$D < 0.2$ AND $D < 1/4W$	1		$D < 0.15$ AND $D < 1/3W$	1
PATTERN WIDTH	SIZE	NUMBER PERMITTED												
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$W < 0.8$	$D < 0.2$ AND $D < 1/4W$	1												
	$D < 0.15$ AND $D < 1/3W$	1												

5.2 EXTERNAL APPEARANCE DEFECTS

ITEM	DEFECTS	CRITERIA
1	LEAKAGE	FAIL
2	INCORRECT POLARIZER ATTACHMENT	FAIL
3	RAINBOW	FAIL
4	CHIPS	<p>a) Edge (non-contact side)</p>  <p>$a < 5$ AND $b < 2$ AND $c < t$, Number of chips < 5</p>

ITEM	DEFECTS	CRITERIA
4	CHIPS	<p>b) Edge (contact side)</p>  <p>$a < 3$ AND $b < 1/2W$ AND $c < t$</p> <p>c) Corner</p>  <p>$a < 3$ AND $b < 1/2W$ AND $c \leq t$</p>
5	GLASS PROTRUSION	 <p>$b < 1/4W$ AND $b < 1.5\text{mm}$</p>

ITEM	DEFECTS	CRITERIA		
		SIZE		NUMBER PERMITTED *
6	SPOT	$0 < D < 0.1$		IGNORE
		$0.1 < D < 0.15$		2
		$0.15 < D < 0.2$ AND $B > 12$		1
		$0.2 < D$		0
D = Average Diameter B = Glass Area cm^2 * = In Viewing Area Only				
7	SCRATCH	WIDTH	LENGTH	NUMBER PERMITTED *
		$b < 0.03$	IGNORE	2
		$0.03 < b < 0.05$	< 1	2
b = Width of Scratch * = In Viewing Area Only				
8	BUBBLE	DIAMETER		NUMBER PERMITTED *
		$0 < D < 0.1$		IGNORE
		$0.1 < D < 0.2$		2
* = In Viewing Area Only				