Delivery Specifications
Film-Film-Glass
4-wire and 8-wire Analog Resistive Touch Technology

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For the latest detailed engineering specifications, please contact your Touch International application engineer. Touch International is committed to continually improving product design, as a result, product specifications may be subject to change without notification.

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1.0 Scope (Range of Application)

This specification document applies to 4-wire and 8-wire analog resistive touch sensors designed for finger, gloved hand or pen input. This specification applies to a film-film-glass backer construction.

2.0 Mechanical/Electrical Characteristics

The specification data below applies to touch screens with the following properties:

- Top polyester conductive layer
- Bottom polyester conductive layer
- Glass backer substrate

2.1 Optical Characteristics

Total Visible Light Transmittance

- Standard top sheet layer: >75 typical
- Enhanced anti-reflective top sheet layer: >80% typical

Note: Other anti-reflective configurations are available. Please consult your Touch International sales person to determine the optimum configuration to meet your needs**.**

2.2 Durability Characteristics

Touch Durability:
1 million touches at a single point with 350gram force; 3 mm radius silicone simulated finger**.**
Surface Hardness: 4H ASTM D3363-92 and 3H or higher with JIS-K5400 standard
Tail Bend: Not less than .25" radii. Note: electrical damage is possible if tail is bent <.25".

2.3 Electrical Characteristics

Insulation Resistance: exceeds 20M ohm or more @DC 25V
Operation Voltage: 2.5V to 5V DC
Chattering Time: 10 msec or less
Linearity: ± 1.5% error or less for X axis (after calibration)
± 1.5% error or less for Y axis (after calibration)
Sheet Resistance of ITO Topsheet -within one screen: All values in any 12"x12" square must be within 10% of the average value in that square.
Sheet Resistance of ITO Topsheet Variation— sensor to sensor: 325~ 500 ohms/sq.
Sheet Resistance of ITO Topsheet Variation— within one screen: All values in any 12"x12" square must be within 10% of the average value in that square.
Sheet Resistance of ITO Bottom Variation— sensor to sensor: 325~500 ohms/sq.
Touch Activation Force: typical 80 grams; refer to the "Touch Screen Illustrations" section.

2.4 Environmental Characteristics

Operating Conditions: -10ºC to 50ºC tested at 35% relative humidity, non-condensing.
Storage Conditions: -20ºC to +60ºC tested at 35% relative humidity, non-condensing.
Humidity: **<40 C tested at 95** % relative humidity, non-condensing.

2.5 Activation Characteristics

In addition to the previously noted parameters, the specification data below applies to touch screens with spacer dot array: .004" diameter and typically .140" spacing.

Touch Activation

- 3 mm silicone simulated finger: 50~80 grams typical force

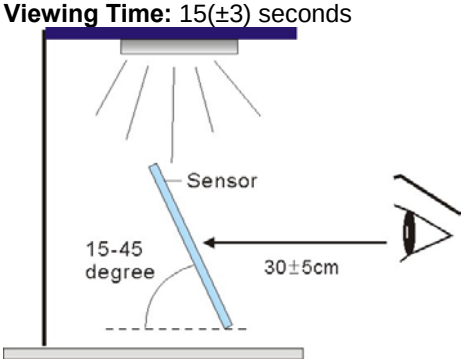
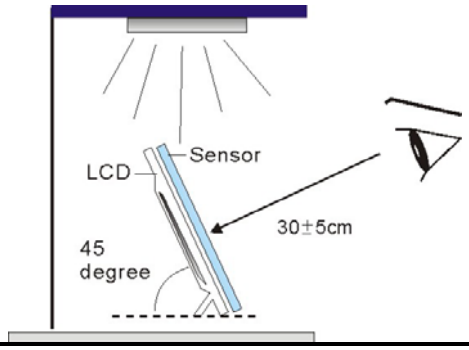
2.6 Chemical Resistance

Chemical compounds: 6% HC1, 40% H2SO4, 10% NaOH and 70% HNO3

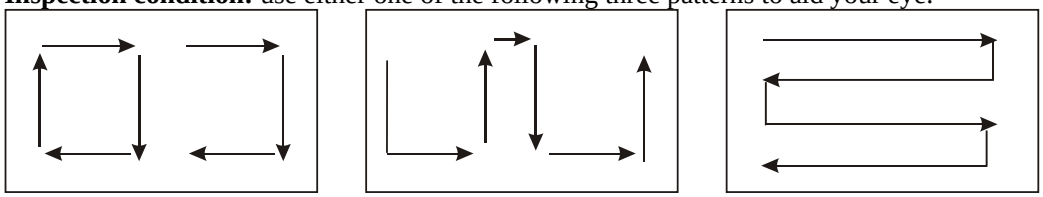
- **Per ASTM F 1598-95–** Industrial Chemicals: acetone, methyl chloride, methyl ethyl ketone, isopropyl alcohol, hexane, turpentine, mineral spirits, unleaded gas, diesel fuel, motor oil, transmission fluid, anti-freeze, etc.
- **Per ASTM D 1308-87–**Food service chemicals: vinegar, coffee, tea, grease, cooking oil, and salt, etc. Household and commercial cleansers, including ammonia-based glass cleaner and laundry detergent.

3.0 Cosmetic/ Visual Specifications

3.1 Inspection Condition

For Sensor under 12"	For Sensor above 12"
Light source: 1000-1400 LUX fluorescent lamps. **Method:** Position the sensor 30(±5) cm far from human eyes with an angle between 15-45 degrees. **Viewing Time:** 15(±3) seconds	**Light source:** 1000-1400 LUX fluorescent lamps. **Background:** White light 300±50 LUX **Viewing Time:** 15(±3) seconds
	

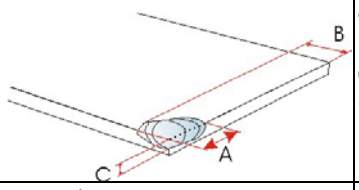
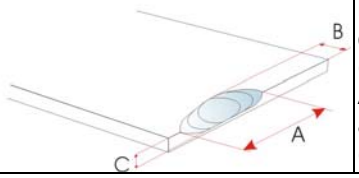
Inspection condition: use either one of the following three patterns to aid your eye.



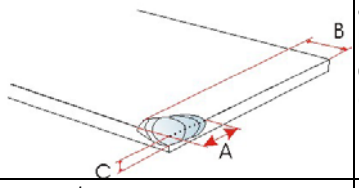
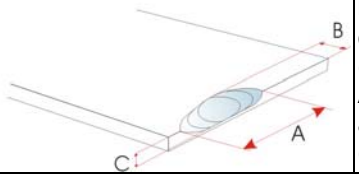
3.2 Inspection Criteria

The following apply to viewing area. Any defects **not** visible shall be ignored, unless they affect electrical performance. This section applies only to inspection of the VA (viewable area). If a defect is found outside of the VA, the screen is still considered acceptable.

The table below shows the visual inspection for sensors below 12":

Items/Type	***Specifications Explain***	
Scratch	**Width / Length**	**Judgment**
	<0.05mm / < 3mm	Allow 2 and min distance above 20mm is Qualified (PASS)
	]0.05mm /]3mm	Unqualified (NG)
Foreign Objective	**(Width+ Length)/2**	**Judgment**
	∗0.2 mm	Qualified (PASS)
	Polish film 0.2mm ~ 0.3mm Anti-grate film 0.2mm~0.4mm	Qualified (PASS) & allow 4 points interval distance above 20mm
	Polish film > 0.3 mm Anti-grate film > 0.4 mm	Unqualified (NG)
Linear Foreign Objective	**Width / Length**	**Judgment**
	∗0.05mm /∗3mm	Allow 2 and min distance above 20mm is Qualified (PASS)
	> 0.05mm / >3 mm	Unqualified (NG)
Puffiness	Height under 0.4 mm:	Qualified (PASS)
Film Surface Flat	Film from reflect light the shape like C	Qualified (PASS)
	Film from reflect light the shape like S	Unqualified (NG)
Edge Fragment	Corner Fragment 	a ∗ 2.0mm, b ∗ 2.0mm and c ∗ *t* mm, (*t*: Substrate Thickness) No more than 2 is qualified (PASS)
	Side Fragment 	a ∗ 3mm , b ∗ 2.0mm and c ∗ 1/2 *t* mm, (*t*: Substrate Thickness) Allow 3 fragments interval distance above 20mm every side is qualified (PASS)
Newton Ring	No Newton rings are allowed in sensors that specify "anti-Newton ring" materials. Otherwise, Newton rings are acceptable.	

The table below shows the visual inspection for sensors above 12":

Items/Type	***Specifications Explain***	
Scratch	**Width / Length**	**Judgment**
	<0.1mm / < 30mm	Allow 2 and min distance above 20mm is Qualified (PASS)
	] 0.1mm /] 30mm	Unqualified (NG)
Foreign Objective	**(Width Length)/2**	**Judgment**
	∗0.2 mm	Qualified (PASS)
	0.2 mm~0.5 mm	Qualified (PASS) & allow 4 points interval distance above 20mm
	> 0.5 mm	Unqualified (NG)
Linear Foreign Objective	**Width / Length**	**Judgment**
	∗0.05mm /∗3mm	Allow 2 and min distance above 20mm is Qualified (PASS)
	> 0.05mm / >3 mm	Unqualified (NG)
Puffiness	Height under 0.4 mm:	Qualified (PASS)
Film Surface Flat	Film from reflect light the shape like C	Qualified (PASS)
	Film from reflect light the shape like S	Unqualified (NG)
Edge Fragment	Corner Fragment 	a∗ 2.0mm, b∗ 2.0mm and c ∗ *t* mm, (*t*: Substrate Thickness) No more than 2 is qualified (PASS)
	Side Fragment 	a ∗ 3mm , b ∗ 2.0mm and c ∗ 1/2 *t* mm, (*t*: Substrate Thickness) Allow 3 fragments interval distance above 20mm every side is qualified (PASS)
Newton Ring	No Newton rings are allowed in sensors that specify "anti-Newton ring" materials. Otherwise, Newton rings are acceptable.	

4.0 Materials Handling and Usage Instructions

In order to prevent accidental use and be guaranteed the performance of product, you are requested to keep the following:

4.1 Storing your Touch International touch screen

- Store the products at specified temperature and humidity range, per the Environmental Conditions section of this document.
- Store the products in the original packing materials.
- Avoid exposing the touch screen to direct sunlight.

4.2 Unpacking your Touch International touch screen

- Do not hold or pull the tail to remove the touch screen component from the package.
- Check and heed the "UP/DOWN" mark prior to opening the package.
- Do not subdue the touch screen to heavy-duty shock or pressure.

4.3 Handling your Touch International touch screen

- Wear gloves when handling the touch screen in order to prevent fingerprints or stains and to avoid injury due to sharp edges.
- Never hold the touch screen by the tail.
- Never bend the tail at less than .25” radius.
- Never add stress on touch film.
- Never place heavy objects or material on top of the touch screen.
- Never stack touch screens on top of each other.

4.4 Cleaning your Touch International touch screen

- Never use organic solvents on the touch screen, except alcohol.
- Use dry cloth or soft cloth with alcohol, neutral detergent or ethanol for clearing the touch panel in case of dirt or residue.

4.4 Assembling your Touch International touch screen

- The bezel or enclosure must not overlap with the viewing area.
- Avoid applying excessive pressure, weight or force on the touch screen.
- Avoid unnecessary strain to the tail during assembling.
- Do not submerge the touch screen in water.
- The edge of the enclosure must be located between the viewing area and the active area.

5.0 Warranty Policy

This warranty policy applies to Touch International’s 4-wire and 8-wire resistive touch screen components. Touch International warrants all products to be free of workmanship or materials defects as specified under the terms of the limited warranty policy per the guaranty period stated below.

5.1 Warranty Period

Touch International guarantees this product for two year from the date of purchase.

5.2 Warranty Exclusions

- Failure to adhere to the handling, storage, operating, assembly or other procedures and parameters outlined in this delivery specification.
- Accidental or purposefully abuse, neglect, or acts of nature.
- Breakage or physical scratches to the touch screen.
- Other factors beyond the control of Touch International