

Touched by BOPLA

Mechanical integration of touchscreens

– Challenges and solutions –

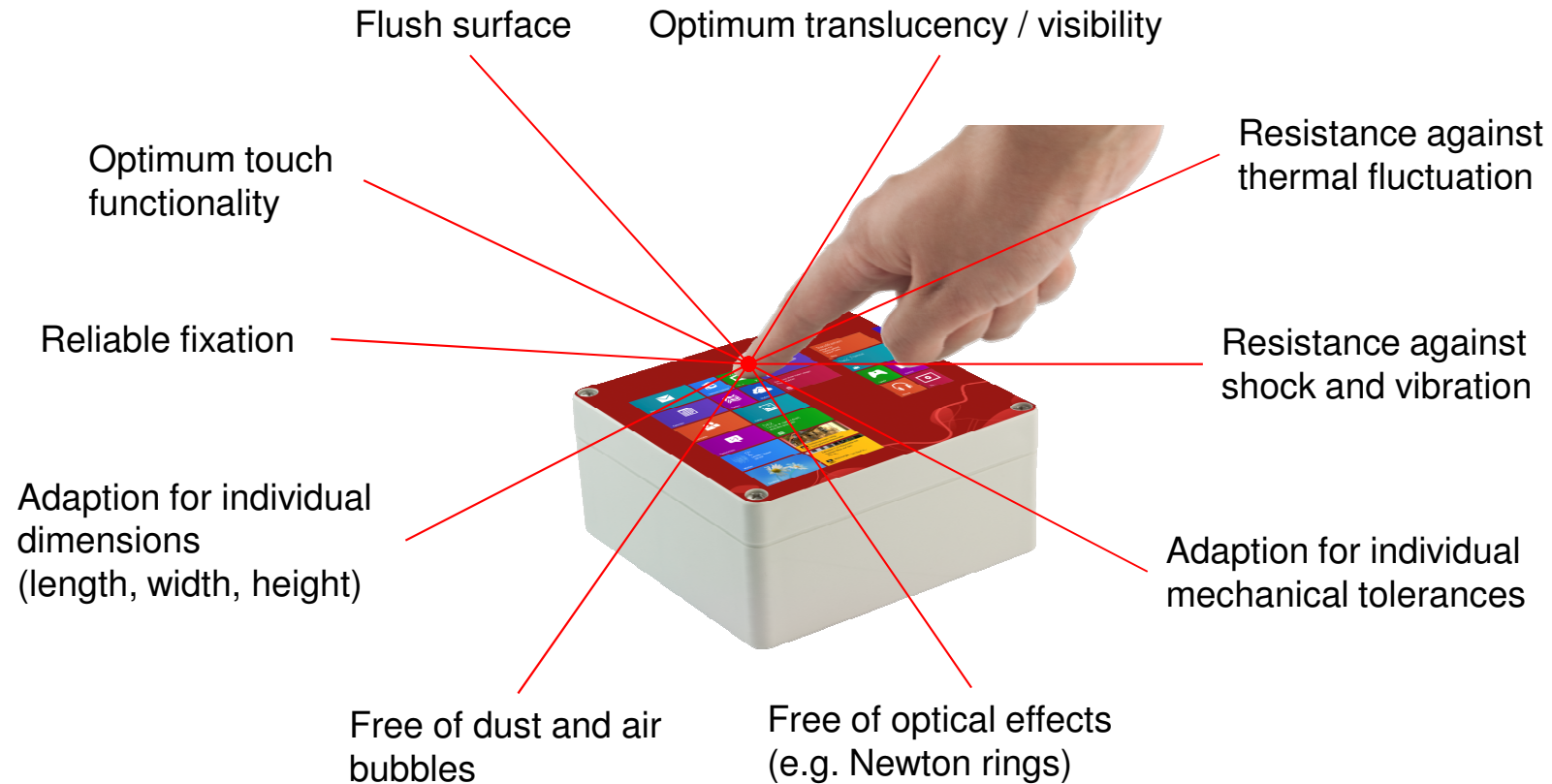


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A Phoenix Mecano Company

Objectives of touch integration



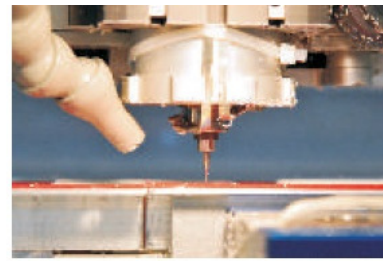
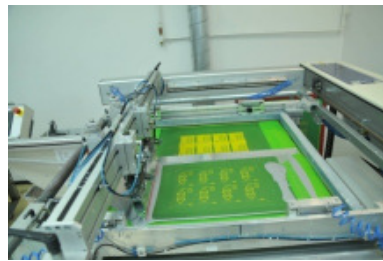
...and on top of everything: optimum mechanical protection for both display and touch screen.

Mechanical integration of touch screens and displays...

...is a **complex** challenge that requires a great variety of individual production processes.

- | | | |
|--------------|--------------|----------------------|
| ✓ Milling | ✓ Adjusting | ✓ Optical bonding |
| ✓ Drilling | ✓ Grouting | ✓ Ultrasonic welding |
| ✓ Printing | ✓ Sealing | ✓ Press fitting |
| ✓ Glueing | ✓ Assembling | |
| ✓ Pasting up | ✓ Lamination | |

All processes and components are critical with regards to quality of the entire system.



Touch screens, displays, embedded PCs



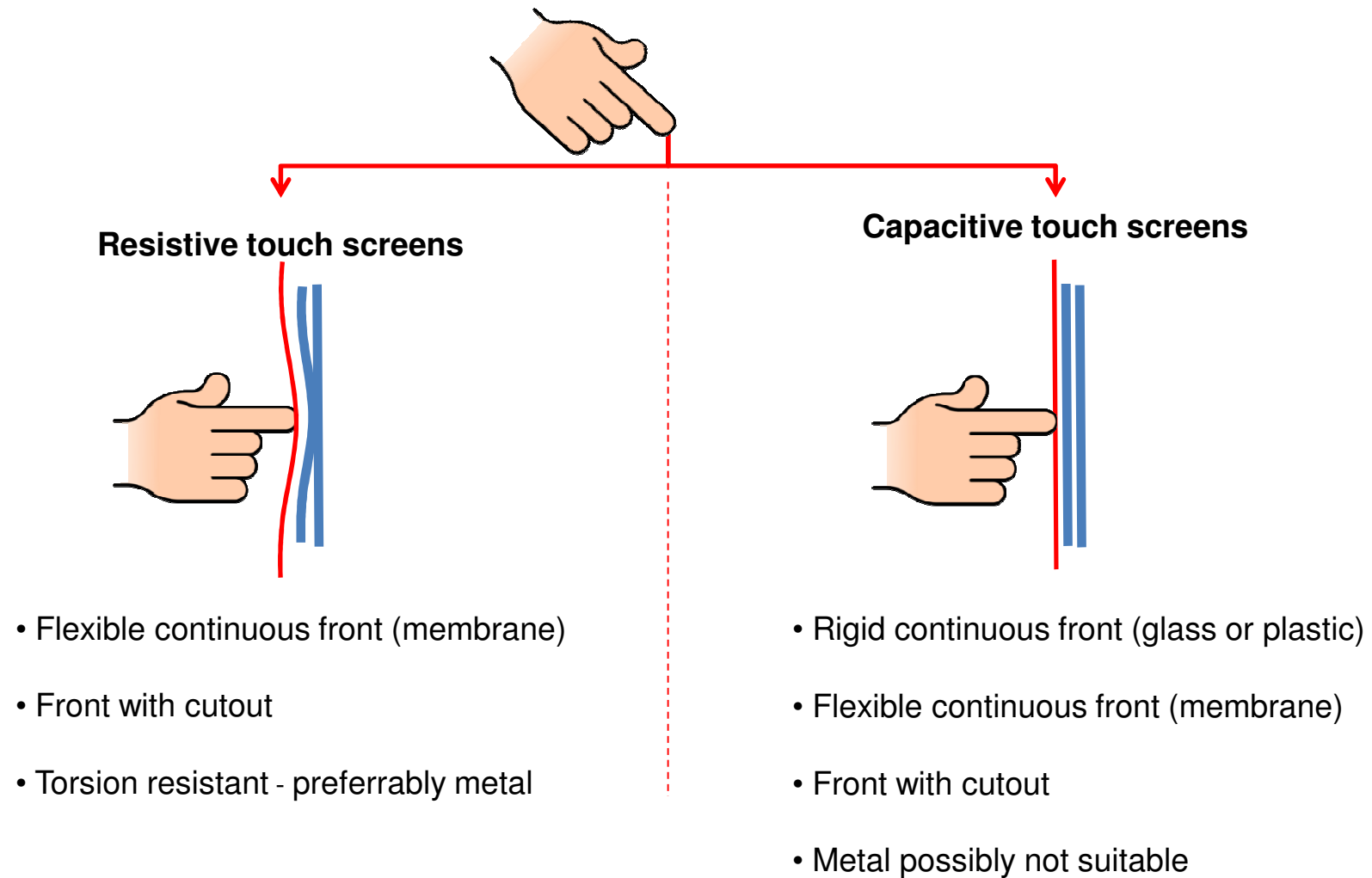
All the same ?



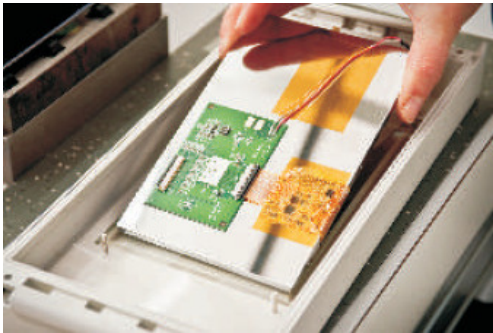
No norms, no standards available – each integration project has lots of individual parameters and challenges involved.

Highly flexible production processes are a prerequisite for high-quality touch integration.

Enclosure fronts – basic requirements



Flush enclosure fronts are the real challenge...



Custom retaining plate plus grouting:

- ✓ Reliable fixation of the display
- ✓ Perfect flush enclosure front
- ✓ Optimum touch functionality



Video Touch integration

<http://www.bopla.de/en/membrane-keypads/product-survey/touch-screens.html>

...BOPLA's trademarked installation method compensates for mechanical tolerances, vibrations and thermal expansion effects.

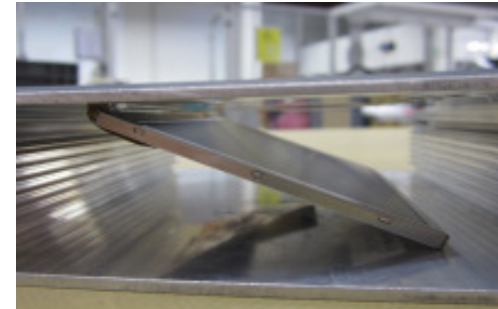
Why retaining plates and grouting ?



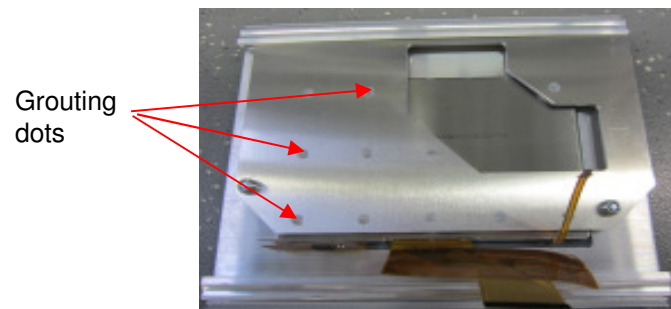
Even if the display provides a
“solid” metal frame for fixation...



...shock and vibration could crack
the entire display...



...or even “kill” adhesive joints.

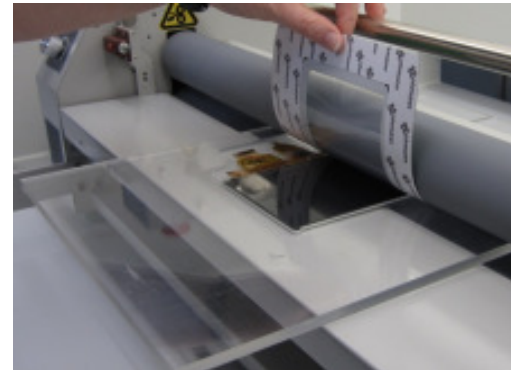
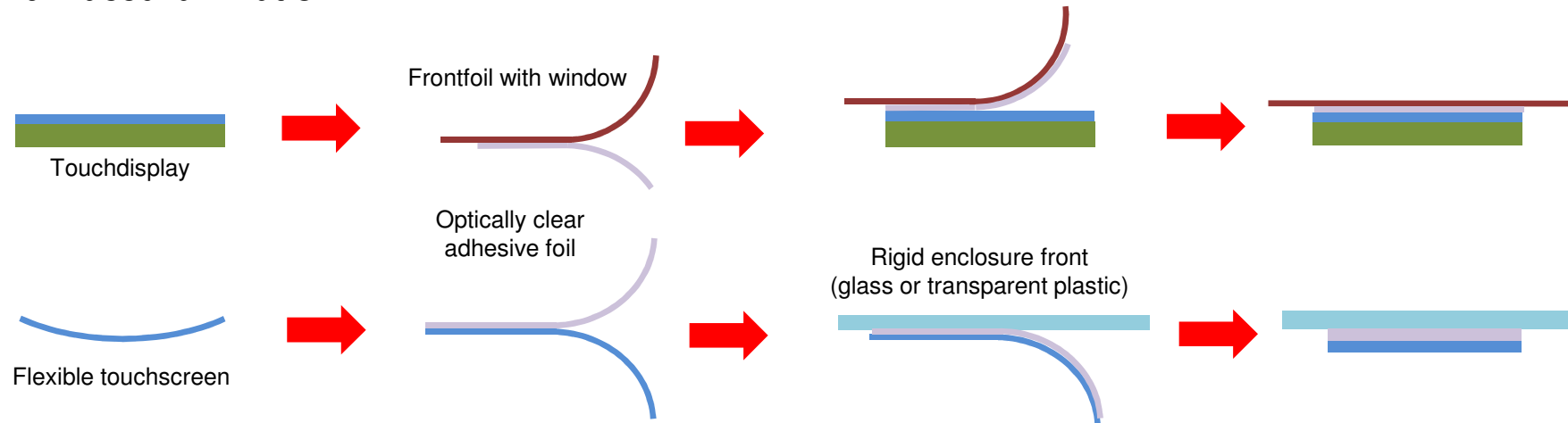


Retaining plate plus grouting dots
ensure a reliable rear fixation ...



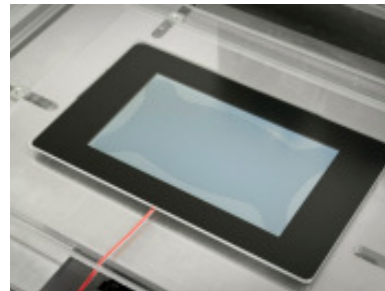
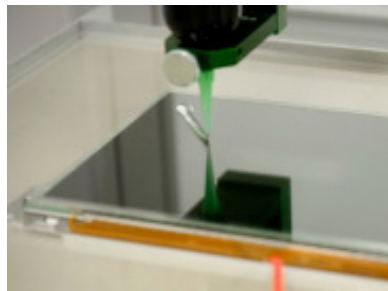
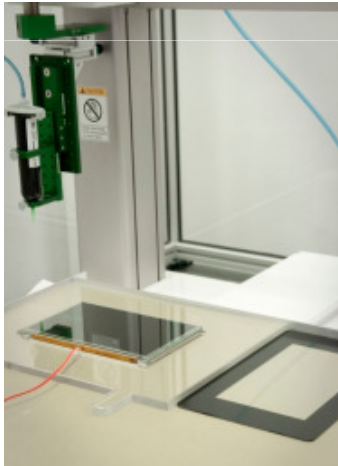
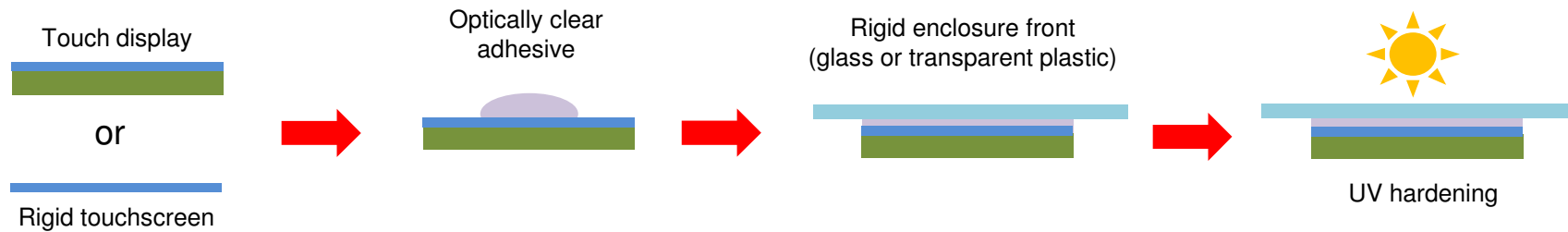
...and can also hold additional
PCBs (e.g. baseboards)

Full faced lamination...

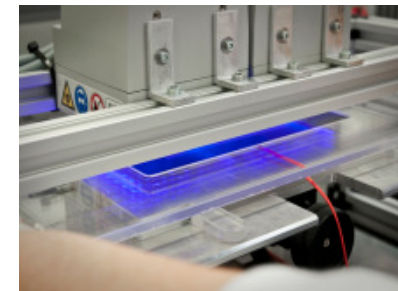


...ensures optimum translucency in fronts with at least one flexible component .

Optical bonding...

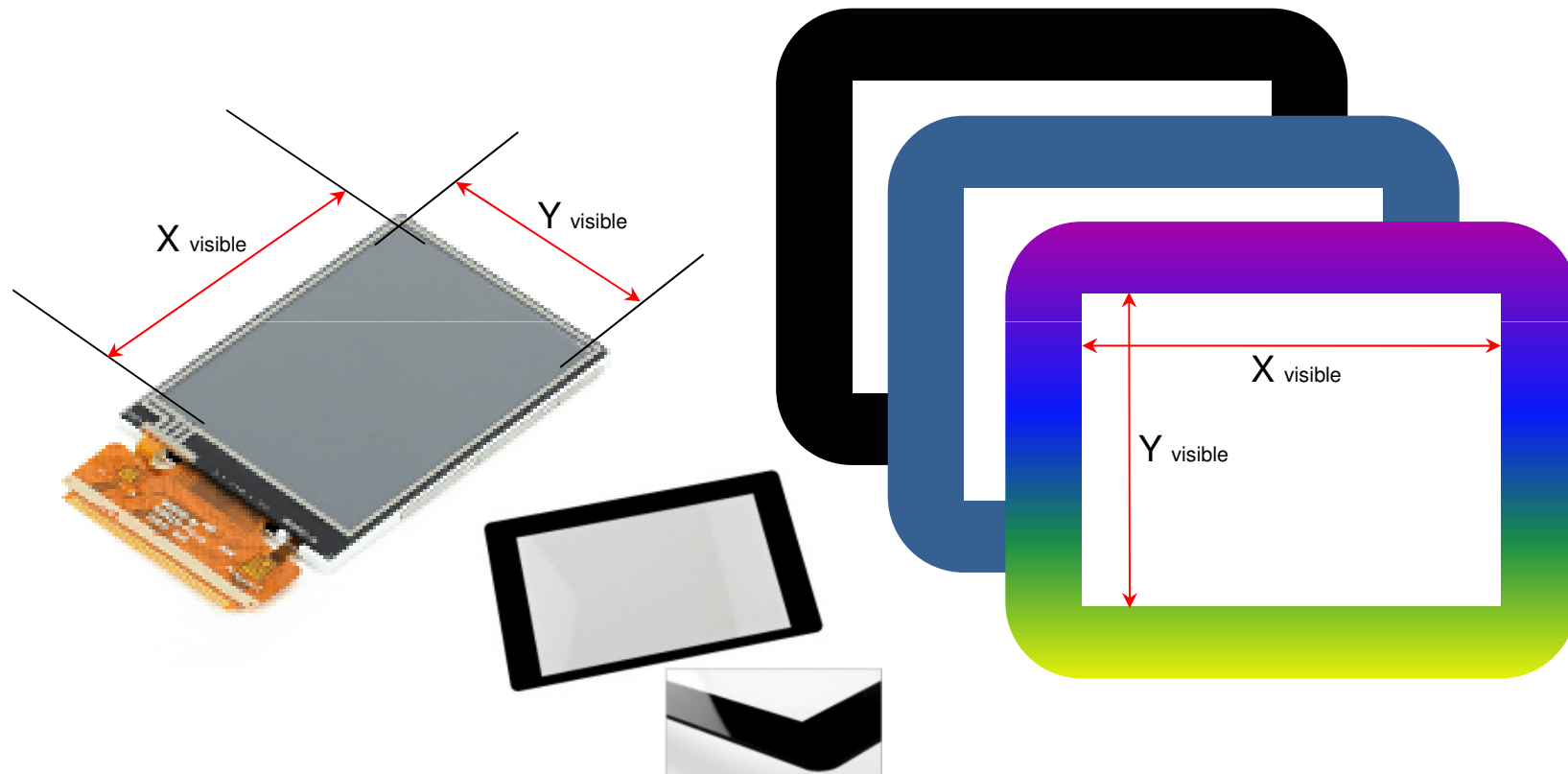


Spreading of the glue has been interrupted for demo purposes



...ensures optimum translucency in fronts with two rigid components

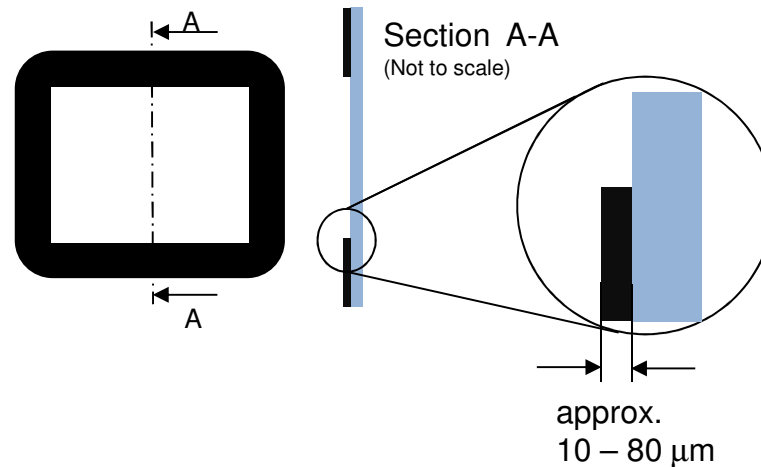
Printing of front membranes and display glasses...



...the flexible way of adaption to display sizes and custom designs.

Hidden secrets...

The “printing edge”

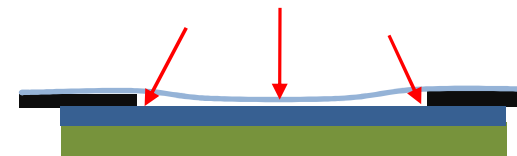


The height of the edge depends on the number of printing layers and printing technology.

=> Graphic design may have a significant impact on feasibility !



Optical bonding perfectly fills the gap

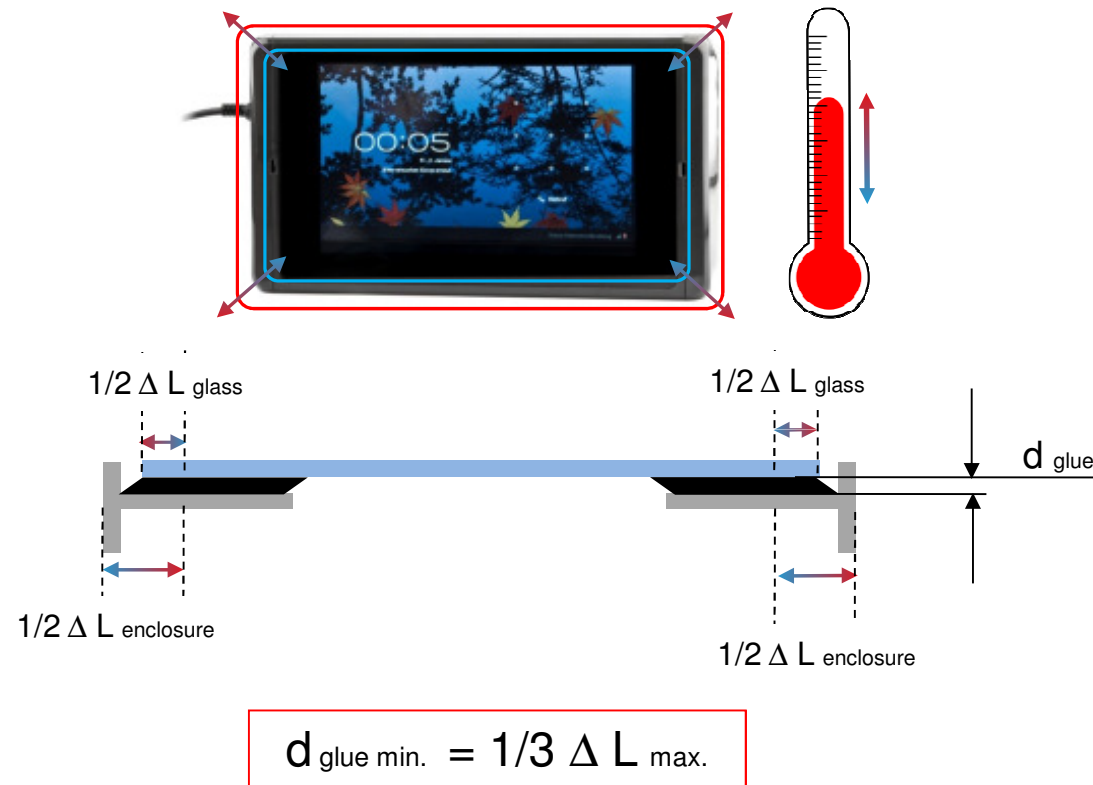


Flexible fronts require more attention to details

...sometimes little details matter.

Hidden secrets...

“The gluing formula”



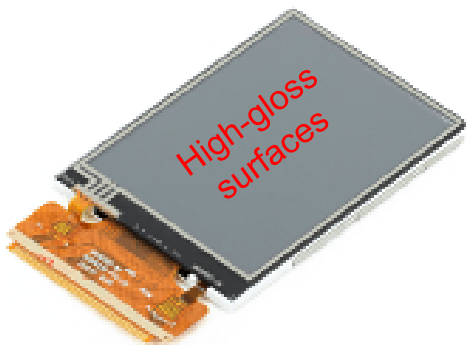
Glued areas need mechanical flexibility in order to cope with thermal expansion and contraction.

...sometimes little details matter.

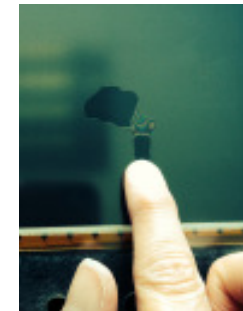
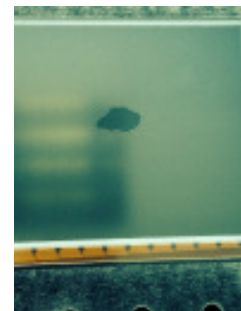
Hidden secrets...



Not suitable for
integration with glueing
technologies involved



Risky with regards to
unwanted adhesion and
Newton rings.

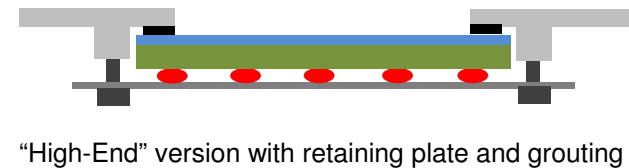
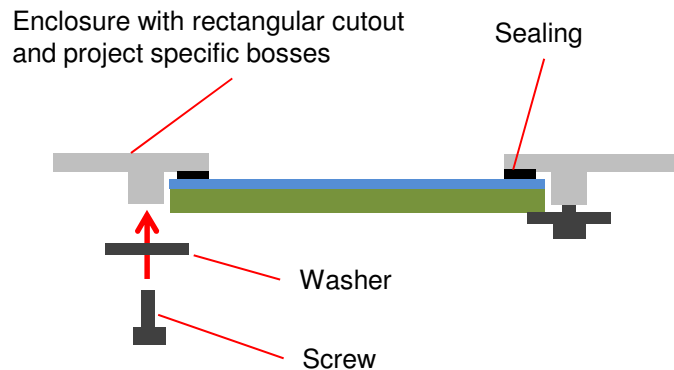


Each integration project is individual; all components are different => feasibility checks are mandatory.

...sometimes little details matter.

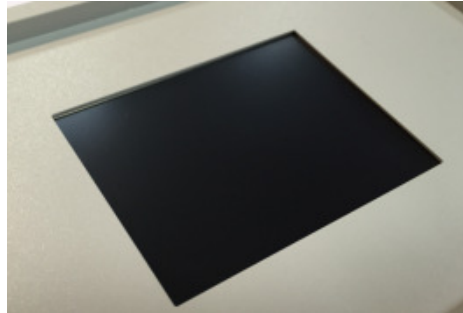
The simple – and cost efficient – way...

1. Provide a rectangular cutout in the enclosure front
2. Attach a self-adhesive flat seal to the touch display
3. Install the touch display from the inside of the enclosure
4. Tighten with a few screws and washers



...stepped front integration.

Stepped front integration...

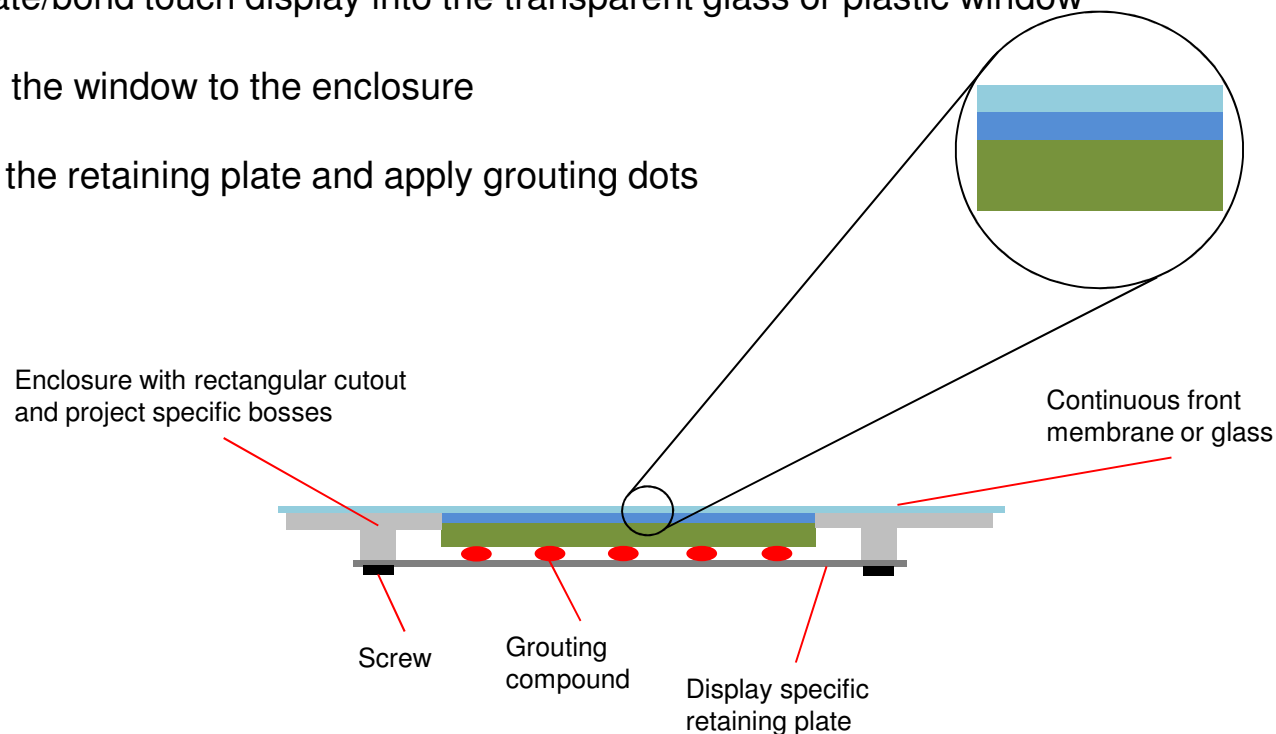


- ✓ Simple and cost efficient
- ✓ Suitable for resistive and capacitive touch
- ✓ Perfect touch functionality
- No protection for the touchscreen
- Limited degree of protection (max. IPx4)
- Step in the enclosure front
- Dirt corners

...the basic solution – also upgradeable with retaining plate and grouting...

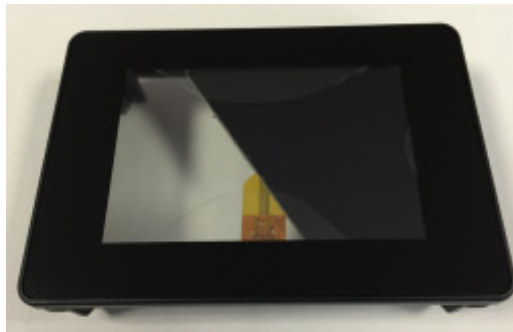
Optical wet bonding or full-faced lamination...

1. Provide a rectangular cutout and bosses in the enclosure front
2. Laminate/bond touch display into the transparent glass or plastic window
3. Attach the window to the enclosure
4. Install the retaining plate and apply grouting dots



...the high-end solution for optimum visibility and mechanical protection

Optical wet bonding or full-faced lamination...



Spreading of the glue has been interrupted for demo purposes / Display has been cut for better visibility.

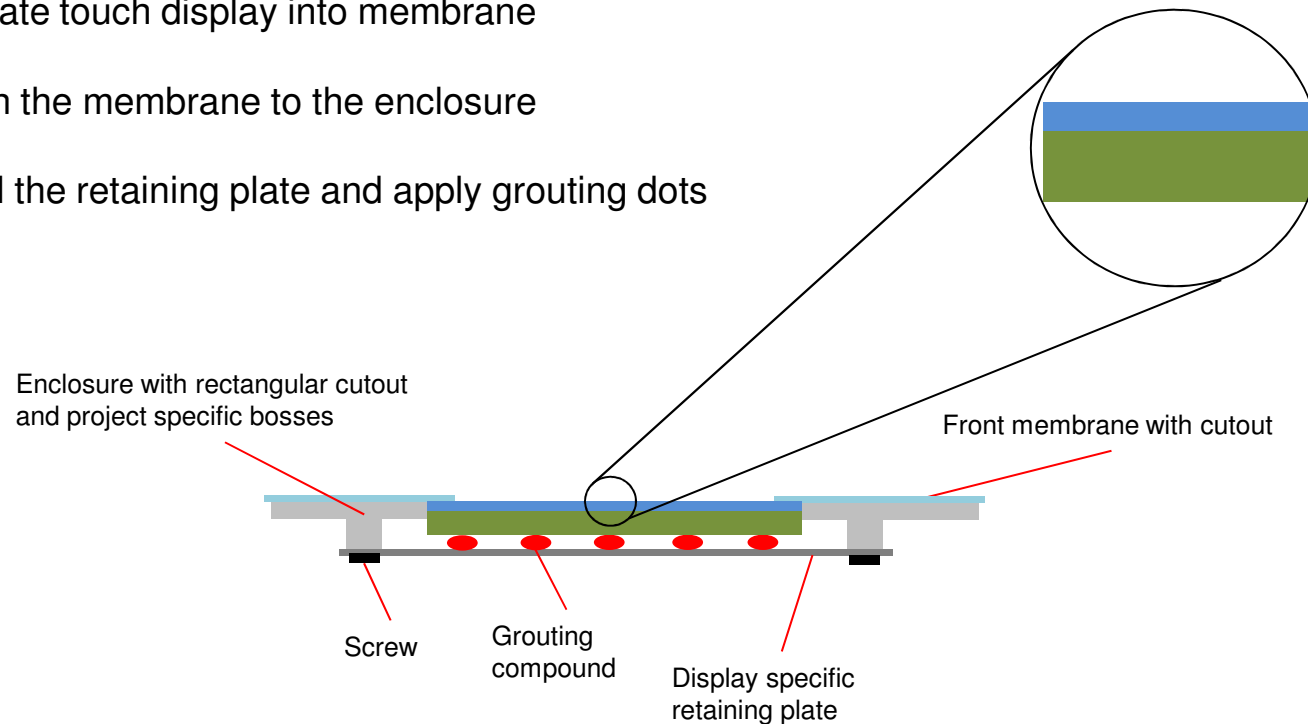


- ✓ Optimum translucency
- ✓ Flush enclosure front
- ✓ Suitable for resistive and capacitive
- ✓ Rugged glass fronts (capacitive only)
- ✓ Glass fronts suitable for outdoor applications
- ✓ IP 65 or higher
- ✓ No „dust trap“
- Complex production process → higher costs

...for applications requiring optimum visibility and optimum mechanical protection

Frame lamination (front membrane with cutout in the display area)...

1. Provide a rectangular cutout and bosses in the enclosure front
2. Laminate touch display into membrane
3. Attach the membrane to the enclosure
4. Install the retaining plate and apply grouting dots



...for applications requiring optimum visibility and cost-efficiency.

Frame lamination (front membrane with cutout in the display area)...



The little edge...



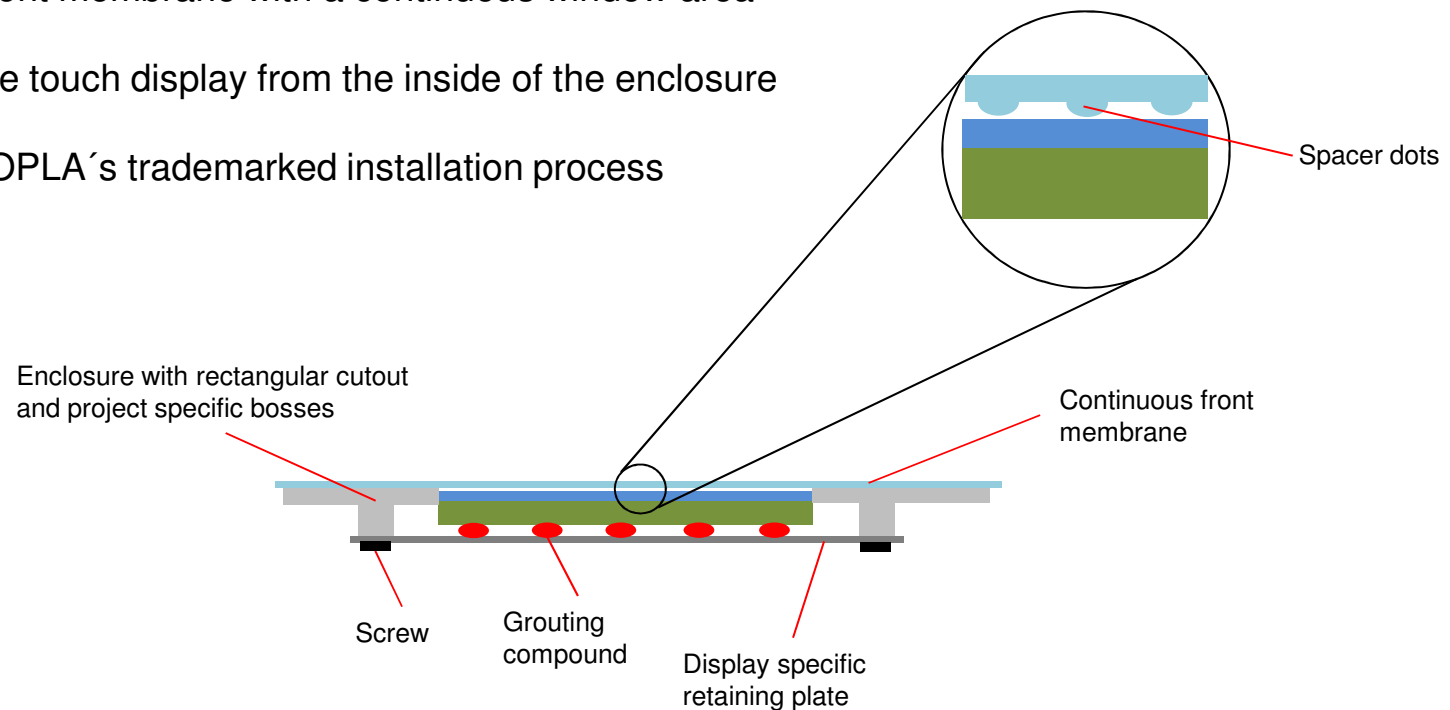
...and grouting dots again...

- ✓ Optimum visibility
- ✓ Optimum functionality
- ✓ Suitable for resistive and capacitive
- ✓ IP 65
- No protection for the touchscreen
- Slight step in the enclosure front
- Slight dirt corners

... for applications requiring optimum visibility and cost-efficiency.

Airgap plus spacer dots...

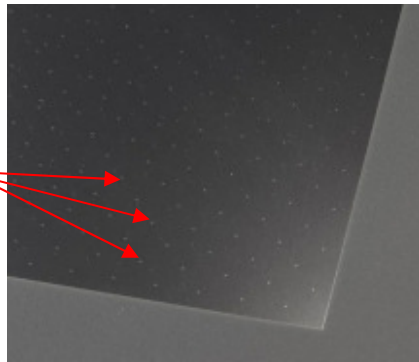
1. Provide a rectangular cutout and bosses in the enclosure front
2. Attach front membrane with a continuous window area
3. Install the touch display from the inside of the enclosure
4. Apply BOPLA's trademarked installation process



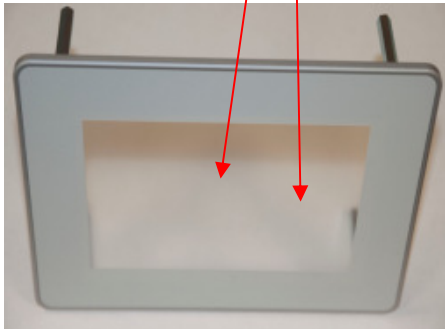
...the cost efficient solution for flush enclosure fronts.

Airgap plus spacer dots...

Almost invisible and nearly impossible to show on a photo...



...but important to avoid unwanted adhesion and Newton rings...



- ✓ Cost efficient
- ✓ Flush enclosure front
- ✓ Protection for the touchscreen
- ✓ Suitable for resistive and capacitive touch
- ✓ IP 65
- Slightly reduced visibility of the display
- Slightly reduced sensitivity of capacitive touch
- Potential „dust trap“ (depending on enclosure technology)

...applications with cost efficient flush enclosure fronts.

Mechanical integration of touch components is a chameleonic business...



...get your project started with the enclosure experts...