

# Data Display Group

## VACUBOND®

# Optical Vacuum Bonding & Vacuum Assembly

## The revolutionary Technology

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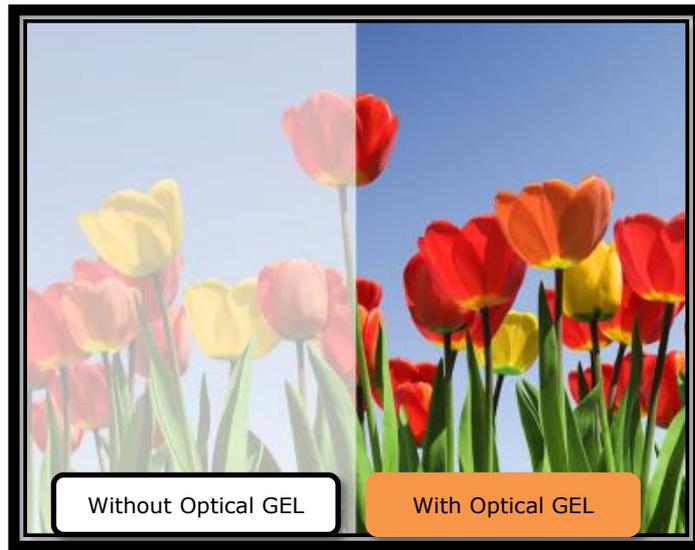
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# Overview VacuBond

Comparison in direct sunlight

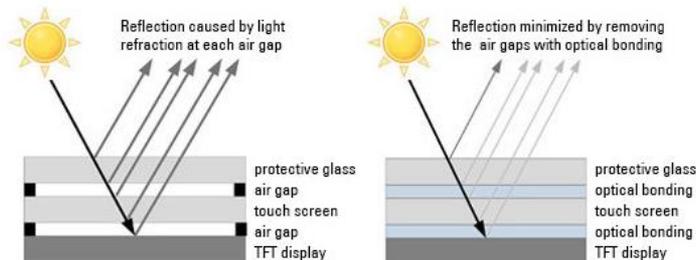


In close strategic and technical co-operation with the Japanese Taica - Group we developed the latest generation of optical bonding and assembly technology.

For supply security and for support of your risk management we installed the identical machines and processes in Germering/Munich, Germany as well as in Ronkonkoma/NY, USA

## Vacuum Bonding doesn't need:

- Drying process / curing time
- Dam construction as wet bonding
- Comprehensive "optical defect specification"
- Stable mechanical structure of TFT



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# Advantages VacuBond

## Advantages VacuBond:

- Perfect contrast and readability in sunshine by eliminating the air gaps between TFT display and cover glass / touch
- No condensation / fogging in air-gap
- Reduced danger of splintering during glass breakage
- Improved shock absorption, more robust construction
- Improved heat transmission via front-glass (up to factor 8)
- Cost-efficient and reliable bonding of small and sensitive TFTs in the range of 2,4" to 7" and of TFTs up to 32" in general
- "free air exclusion" bonding: we fill free space inside of the TFT by bonding (ex-protection)
- We can directly bond into your front-panel
- High precision in production due to production jig and automated process
- Our process is reversible, we can re-bond e.g. for repair

## Advantages Assembly with VacuBond:

- Easy assembly of the fragile new generation TFT displays without metal housings
- Zero anomalies production (opaque, translucent) makes a cosmetic specification superfluous
- Assembly of protective glass of any thickness for increased ruggedness (drop ball tests, IEC60721-3-7as well as MIL STD 810F passed with VacuBond)
- Assembly of touch screens of all common technologies: resistive, glass/glass, AMR, projected capacitive
- Assembly at room temperature in contrast to assembly in autoclaves, which may exceed the maximum specified temperature of the touch screen.



Modern 3,2" TFT display assembled in VacuBond technology with a protective glass



Same 3,2" TFT display without protective glass: the very small bezel and the fragile mechanics do not allow for tape assembly or wet bonding



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# Advantages VacuBond

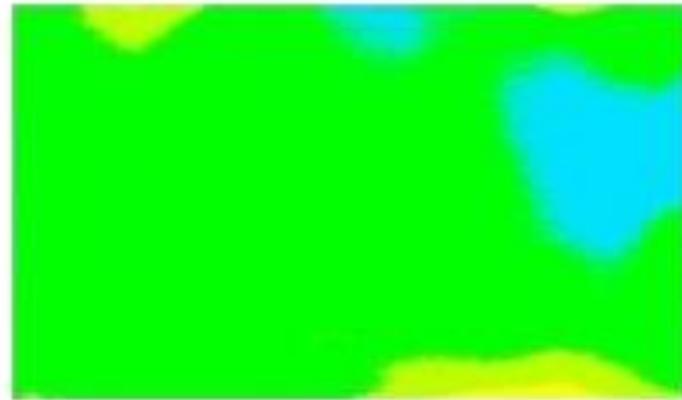
## Superior Screen Uniformity

Mura comparison wet bonding versus *OPTALGEL*

Mura = Luminance non-uniformity (flashlighting, clouding...etc)



0,3mm wet bonding



0,5mm *OPTALGEL*

Mura relation *OPTALGEL* versus wet bonding: 0,46

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# Features/Performance

## Features:

- Bonding of all sizes up to 32"
- Bonding of touch screens in all technologies
- Bonding of safety glasses & touch panels
- Bonding of pure TFT cell without bezel possible
- Perfect material stability over time (e.g. no yellowing)
- Fast sample production

## Performance comparison OCA versus OCA Tape versus Opto-GEL

	LOCA	OCA Tape	Opto-GEL <b>VACUBOND</b> <sup>®</sup>
<b>Gap Filling</b>	Excellent	Limited / Poor	Excellent
<b>Repairability</b>	Can be done at pre-curing stage	Cannot be done	Can be done always
<b>Assembly Process</b>	Can be fully automated	Semi-automated	Is fully automated
<b>Adhesion/Reliability</b>	High	Low	High
<b>Curing</b>	Days	None	None
<b>DAM necessary</b>	Yes	No	No
<b>Inventory</b>	Various liquid adhesives	Various pre-die cuts	Various pre-die cuts

# Optical Bonding Service



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## Cover Glass / PMMA

Schott Xensation™ (Thin & High Hardness)  
Corning Gorilla Glas™

Toughened Safety Glass  
Ceramic or Organic Silkscreen

PMMA slice

Economy Safety Glass

## Touch Screen

Projected Capacitive Touch

Resistive Touch Glass/Glass

Infrared (IR) Touch

Resistive Touch Film / Glass

Analog Matrix Resistive MultiTouch

Visit our Website: [Optical Bonding of the most modern Generation: Vacuum Bonding](#)

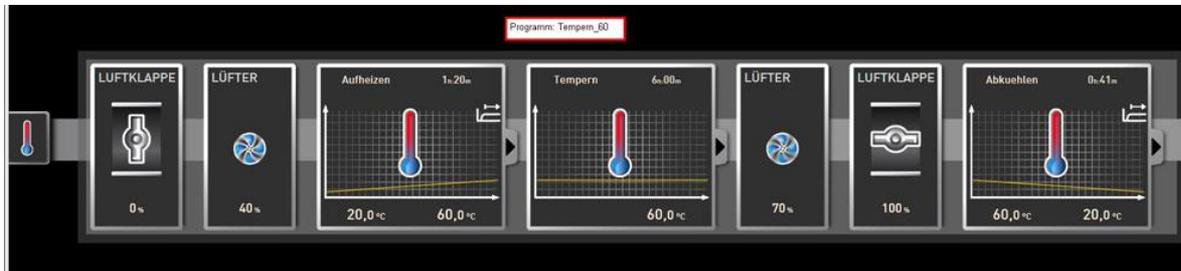
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## Industrial heating cabinet for a logged tempering or pre-aging service

By means of software-controlled temperature programs, we can now expose modules up to a diagonal of 54.51 cm (21.5 inches) to temperatures ranging from +30 to + 300°C. Long-term programs and complex experiments over several days are also possible.

The heat treatment detects possible weak points on the products due to simulated strong strain and thus helps to prevent breakdowns in the field. We are happy to check your product according to your temperature requirements.



Example for a temperature program



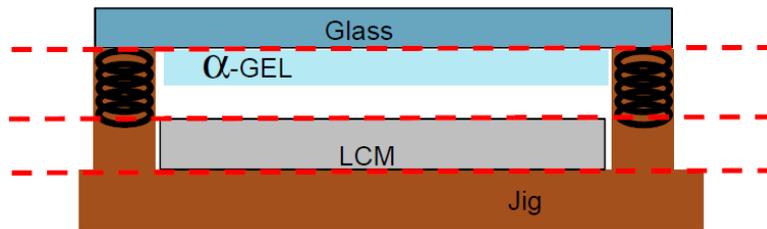
Industrial heating cabinet



# JIG Tooling

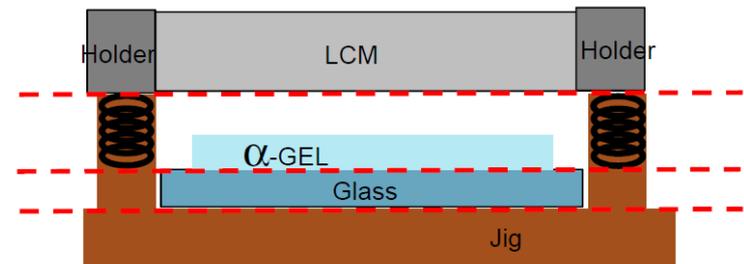
The vacuum bonding process uses production jigs, is fully automated and therefore very stable in yield and precision.

## Glass on Top



- The Glass is larger than the TFT-Display
- The Glass is located directly on the edges
- The rear side of the TFT-Display is flat

## Glass on Bottom



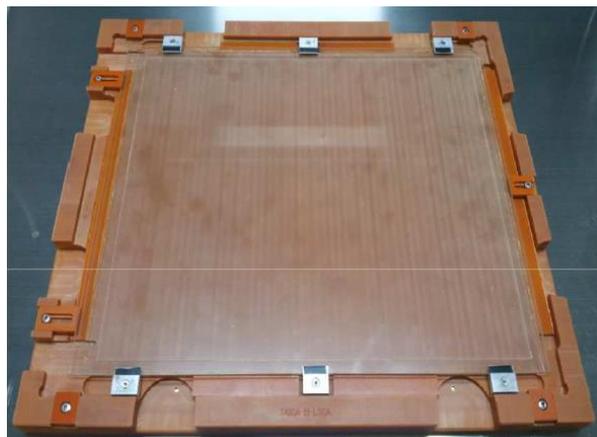
- The Glass is not larger than the TFT-Module
- The TFT-Module located on an extension metal frame
- The rear side of the TFT-Module is not flat



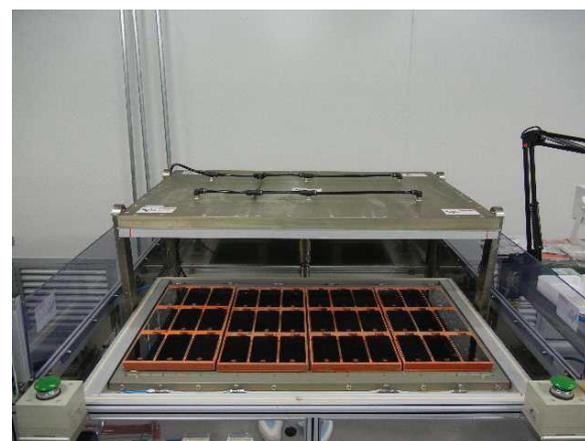
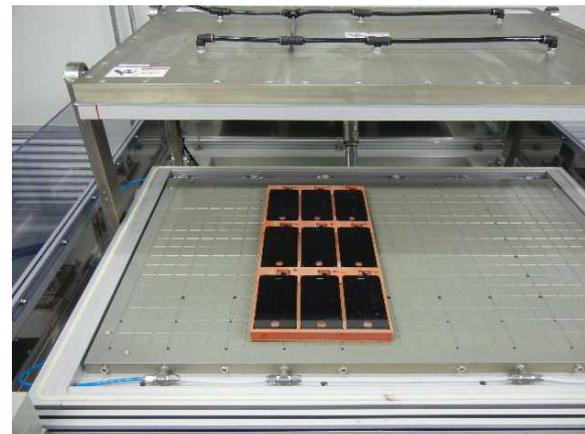
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# JIG Tooling

## Single based JIG



## Multi Module based JIG in Vacuum Chamber



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# Examples



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## Example 1:

**Bonding a small, fragile TFT display with protective glass**



*OPTAGEL*® on carrier foil



Protective glass

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# Examples



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Fragile small TFT display



Protective glass with *OPTAGEL*

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# Examples



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Complete unit: TFT Display with protective glass optically bonded with VacuBond®

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## Example 2:

### Free-air-exclusion bonding of a large TFT Display with Cover Glass



Protective glass with *OPTAGEL*



TFT Cell

# Examples



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TFT rear cover, open spaces filled with *OPTA GEL*

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# Examples



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Free-air-exclusion TFT Display with protective glass optically bonded with VacuBond®

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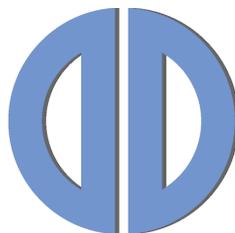
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