Data Display Group

vacuBOND®

Optical Vacuum Bonding & Vacuum Assembly

The revolutionary Technology

Content:
- Overview VacuBond
- Advantages
- Features / Performance
- Optical Bonding Service
- Tempering / Pre-Aging Service
- JIG tooling
- Examples
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
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, IEC60721-3-7 as 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.
Superior Screen Uniformity

Mura comparison wet bonding versus \textit{OPT\textalpha\textregistered GEL}.

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

Mura relation \textit{OPT\textalpha\textregistered GEL} versus wet bonding: 0.46
### 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

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

- Schott Xensation™ (Thin & High Hardness)
- Corning Gorilla Glass™
- Toughened Safety Glass
- Ceramic or Organic Silkscreen
- PMMA slice

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
Tempering / Pre-Aging Service

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
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
Example 1:
Bonding a small, fragile TFT display with protective glass

OPTαGEL on carrier foil

Protective glass
Examples

Fragile small TFT display

Protective glass with OPTA\textsuperscript{GEL}

your specialist for flat screen solutions
Complete unit: TFT Display with protective glass optically bonded with VacuBond®
Example 2:
Free-air-exclusion bonding of a large TFT Display with Cover Glass
Examples

TFT rear cover, open spaces filled with **OptaGel**
Examples

Free-air-exclusion TFT Display with protective glass optically bonded with VacuBond®
Our company network supports you worldwide with offices in Germany, Great Britain, the USA and Turkey.

For more information please contact:

**Distec GmbH**
Augsburger Str. 2b
82110 Germering

**Display Technology Ltd.**
5 The Oaks Business Village
Revenge Road, Lordswood
Chatham, Kent, ME5 8LF

**Apollo Display Technologies, Corp.**
87 Raynor Avenue, Unit 1
Ronkonkoma, NY 11779

**FORTEC Elektronik AG**
Lechwiesenstr. 9
86899 Landsberg am Lech

**DATA DISPLAY GROUP**
A FORTEC GROUP MEMBER

**Germany**
Phone: +49 (0)89 / 89 43 63-0
Fax: +49 (0)89 / 89 43 63-131
E-Mail: info@datadisplay-group.de
Internet: www.datadisplay-group.de

**United Kingdom**
Phone: +44 (0)1634 / 67 27 55
Fax: +44 (0)1634 / 67 27 54
E-Mail: info@displaytechnology.co.uk
Internet: www.datadisplay-group.co.uk

**United States of America**
Phone: +1 631 / 580-43 60
Fax: +1 631 / 580-43 70
E-Mail: info@apollodisplays.com
Internet: www.apollodisplays.com

**FORTEC Elektronik AG**
Lechwiesenstr. 9
86899 Landsberg am Lech

**Germany**
Phone: +49 (0)8191 / 911 72-0
Fax: +49 (0)8191 / 217 70
E-Mail: sales@fortecag.de
Internet: www.fortecag.de

**DATA DISPLAY BİLİŞİM TEKNOLOJİLERİ İÇ VE DIŞ TİCARET LIMITED ŞİRKETİ**
Barbaros Mh Ak Zambak Sk A Blok D:143
TR-34376 Ataşehir/Istanbul

**Turkey**
Phone: +90 (0)216 / 688 04 68
Fax: +90 (0)216 / 688 04 69
E-Mail: info@data-display.com.tr
Internet: www.data-display.com.tr

your specialist for flat screen solutions