LA LED À L'ASSAUT DU MONDE DE L’ENSEIGNE…

ECRIN
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2007

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Global LED
Project Manager

AGENDA

• Présentation TRIDONIC ATCO

• Exemples de projets internationaux
Le groupe ZUMTOBEL investit dans la LED…

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TRIDONIC.ATCO

In Austria

18 M Electronic Ballasts / year

45 M Fluorescent Ballasts/yr,
3 M Transformers year,
5 M HID Ballasts/yr

35 millions LED / year

Dornbirn
Innsbruck
Fürstenfeld
Jennersdorf

TRIDONIC.ATCO

UNE GAMME COMPLETE DE COMPOSANTS

POWER SUPPLY UNITS
- powerCONTROL PCI
- EM PAK
- OPAK
- OAK

CONTROL GEAR
- EM Pro
- EM Selftest
- EM Basic
- Batteries

EMERGENCY LIGHTING MODULES for fluorescent lamps
- PC Combo
- EM R935

DIGITAL DIMMING
- PCA EXCEL
- PCA ECO
- moduleDIM
- smartDIM

CONTROL GEAR for fluorescent lamps
- PC PRO TS LP
- PCE 911
- PC Compact
- EC A50

LED-MODULES and CONTROL GEAR
- spaceLED
- powerLED strip modules
- LED Strip
- LED RGB
- LED Converters

TRANSFORMERS
- TMDD
- OWTA
- TE one4all
- TE speedy

CAPACITORS
- Capacitors
- ZWM

CAPACITORS
- EM R935
- TMDD
- OWTA

CONNECTION TECHNOLOGY
- Crimping technology
- Contact joint connector
- Spring connector
WE OFFER A FULL RANGE OF LED MODULES, CONVERTERS AND CONTROLS

- Light Chains
- powerLED strip modules
- LED Spot
- RGB LED
- LED Converters
- LED Controls

TRIDONIC Optoelectronics

Mass Production started in Jan 2000
80 people
120,000 LED / day
50 kms of chains / month

Design, research, production, after sales
CORE COMPETENCES – R&D

- White light emission layer coating narrow tolerance window
- Chip on Board Technology close proximity spacing ~50µm high precision ~10µm
- Optical Design
- Electronic Design
- Thermal Design
- Global supply chain management
- Industrialisation – mass production
- Reliability and qualification process

LED: 3 Different technologies on the market

- **Radial:** 3mm / 5mm
- **SMD:** + 2mm
- **Chip On Board (COB):** 0.1 to 1mm
LED in “Advertisement & Signage”

- Advantages of LED solutions in “Signage” applications in general
  - Cost Savings
    - Long lifetime & Robustness -> Maintenance cost ↓
    - Efficiency -> Energy cost ↓
    - Total cost of ownership ↓
  - Safety
    - Low Voltage (SELV)
  - Color Saturation
  - Innovation / Image

- Advantages of TridonicAtco LED solutions in “Signage” Applications
  - COB Technology
    - Excellent Thermal Management -> light output ↑ & lifetime ↑
    - Wide Angle Light Distribution
    - Protection against humidity, condensation & non-permanent water
  - White light superior quality – no binning
  - Flexibility – many colors, lengths, etc.
  - Guarantee, Warranty
  - Reputation, Global acting company

a world of bright ideas®
TRIDONIC.ATCO

LED : 3 Different technologies on the market

3 Wired: angle of 60 – 90°
2 SMD: angle of 80 – 110°
1 COB: angle of 140°

COB gives you:

⇒ The best uniformity
⇒ The lowest depth
⇒ Possibility to illuminate the sides

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A FULL RANGE OF COLORS

ORANGE
AMBER
RED
GREEN
BLUE
YELLOW

White 3000 K  White 4200 K  White 6500 K

LED RGB (Red / Green / Blue)

How do we create White LED Light?

Color Conversion Technique based on Blue LEDs

⇒ “Cold“ to “Warm“ color temperatures 2500-8000 K with novel class of inorganic phosphors (i.e. BOSE, λ.max from 510 to 595 nm, CRI>75)

- Cooperation with the technical University of Graz (Austria)
- Cooperation with a leading chip manufacturer, Toyoda Gosei, Japan, part of TOYOTA Motors.
Key Competence – Color Conversion, white LED

- Worldwide patents for phosphor for Color Conversion:
  - Defined color temperatures: 3000 / 4200 / 6500K
  - Several LED manufacturers pay licence fees to Tridonic.Atco

- White light performance
  - Lowest tolerances of color temperature and CIE coordinates
  - No binning

White LED: A low tolerance is required...

If not, you can have such result!

Color variation: a key issue for the illumination so be careful with the specifications of the LED and the reliability of the products and manufacturers.

Remember about market split for signage market:
- 60% White
- 35% Red
- 5% Others
For each color, a different lifetime!!

Red, Orange => From 50 to 100,000h
Green, Blue, White => From 40 to 50,000h (T50)
Reminder : 30 000h (T70)
Rappel : 1year (11h / day) = 4000h 0,1% defect / 1 000h de fct

The expected life time is directly linked to the application and mainly the operated temperature of the module in the application.
AN ALTERNATIVE FOR FLUORESCENT TUBES

BEFORE

EXISTING INSTALLATION WITH FLUORESCENT LAMPS.

AFTER

NEW SOLUTION WITH POWER LED.

COMPARISON OLD & NEW SOLUTIONS

Before

Now

LED CHAIN MOUNTED IN THE TUBE.
AN ALTERNATIVE FOR FLUORESCENT TUBES

INTERNATIONAL CONCEPT

MAINTENANCE COSTS REDUCED by 80%

PRODUCT DESIGNED FOR DIFFICULT AMBIANT CONDITIONS

17,000 SERVICE STATIONS

250 Kms BULLNOSE ALREADY INSTALLED

ENERGY SAVINGS : 20 MILLIONS DE kWh / year

ENERGY SAVINGS with P511 RED

<table>
<thead>
<tr>
<th>Type</th>
<th>Magnetic</th>
<th>Magnetic</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lamps 58W</td>
<td>116W</td>
<td>116W</td>
<td>13W</td>
</tr>
<tr>
<td>LED 27 modules</td>
<td></td>
<td></td>
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<td>Ballast</td>
<td>type &quot;C&quot;</td>
<td>type &quot;B2&quot;</td>
<td></td>
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<tr>
<td>Converter</td>
<td>24W</td>
<td>18W</td>
<td>2,6W</td>
</tr>
</tbody>
</table>

Total 140W max 134W max 15,6W

SAVING / LED 124W 118W

Example for 1 bullnose of 2,7m

In this project, the power consumption was lowered by 8!
AND FROM BRIGHTNESS LEVEL?

TOTAL logo
400 Cd/m²

And for the red bullnose?

PAYBACK CALCULATION

Costs split

Simulation 16h/24 - 0,1 euros / kWh

Existing solution  LED & Aluminium LED & PRIMA

Simulation 24h/24 - 0,1 euros / kWh

Existing solution  LED & Aluminium LED & PRIMA
PAYBACK CALCULATION

Pay back period:
Red: from 6 months to 2 years
White: 1 – 3 years

Differences are due to:
⇒ Labour costs
⇒ Electricity cost
⇒ Working time per day
⇒ And market price of products!!!
NOTRE MISSION,
METTRE EN VALEUR VOS ENSEIGNES

Concessions automobiles, ils nous ont fait confiance :

RENAULT, TOYOTA, LEXUS, NISSAN, FORD, PEUGEOT, FERRARI, MASERATI

DUREE DE VIE IMPORTANTE

REQUESTS FROM RENAULT WERE...

REDUCE THE POWER CONSUMPTION

REACH A GOOD UNIFORMITY LEVEL

LIMIT THE VARIATION OF BRIGHTNESS LEVEL FOR EACH LETTER

INCREASE THE LIGHT LEVEL FOR COLD TEMP.

OPTIMISATION OF THE TRANSPORT COSTS

REPLACE HIGH VOLTAGE NEON CONVERTER

INCREASE LIFETIME
White LED, sign’s creation

White during the night

Gray during the day

AN ALTERNATIVE FOR NEON TUBES

White LED 6500K OPTIMIZED for Grey & White / ALTUGLAS acrylic

INTERNATIONAL PROJECT

13,500 SITES ALL OVER THE WORLD

PERFECTLY UNIFORM ILLUMINATION

ENERGY SAVING: 65%

SAFETY EXTRA LOW VOLTAGE: SECURITY

MAINTENANCE COSTS REDUCED BY 50%

700 kms supplied all over the world
RENAULT

VIEW OF THE OPEN LETTERS

WHAT'S ABOUT BRIGHTNESS LEVEL?

150 Cd/m_
NOTRE MISSION, METTRE EN VALEUR VOS ENSEIGNES

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DES REFERENCES TOUJOURS PLUS NOMBREUSES...

MEILLEURE SATURATION DES COULEURS

Hôtels (Mercure, Novotel, Hilton,...) restauration rapide (Mc Donald, KFC, Quick,...)
DES REFERENCES TOUJOURS PLUS NOMBREUSES...

SECURITE ABSOLUE

Supermarchés : Carrefour, Auchan, Casino, Cora, Champion, Metro, Intermarché, Migros, Mediamarkt, Super U, Suburbia, Home Depot, Mega,…

AUCUN RAONNEMENT UV & IR

Supermarchés : Carrefour, Auchan, Casino, Cora, Champion, Metro, Intermarché, Migros, Mediamarkt, Super U, Suburbia, Home Depot, Mega,…
DES REFERENCES TOUJOURS PLUS NOMBREUSES...

Banques (Caisse d’Epargne, LCL, Crédit Mutuel, Bank of communication, Standard bank, Bank of Austria…)

Boutiques (Cartier, Chanel, Krys, Lissac, Nike, Hermes, SFR, RATP, Intersport etc…)

Plus de 200 références pour des marques nationales ou internationales

Des applications toujours plus nombreuses
Des applications toujours plus nombreuses

Automotive:
- exterior lighting function
  - e.g. BMW, Audi, PSA

Transportation, Aerospace
- mood lighting Airbus A380
- SSL-illumination Airbus A340
- SSL-illumination Cruise Ships

source: Audi
source: BMW
source: Light + Sound
source: Airbus
MANAGEMENT SYSTEM: several certifications

- process control according to 6 Sigma and TPS*
- ISO 9001:2000
- VDA 6.1 (TS 16 949 will follow in 2007)
- ISO 14001

* TPS: Toyota Production System

Michael MASSOT
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