

Connecting your LED application.

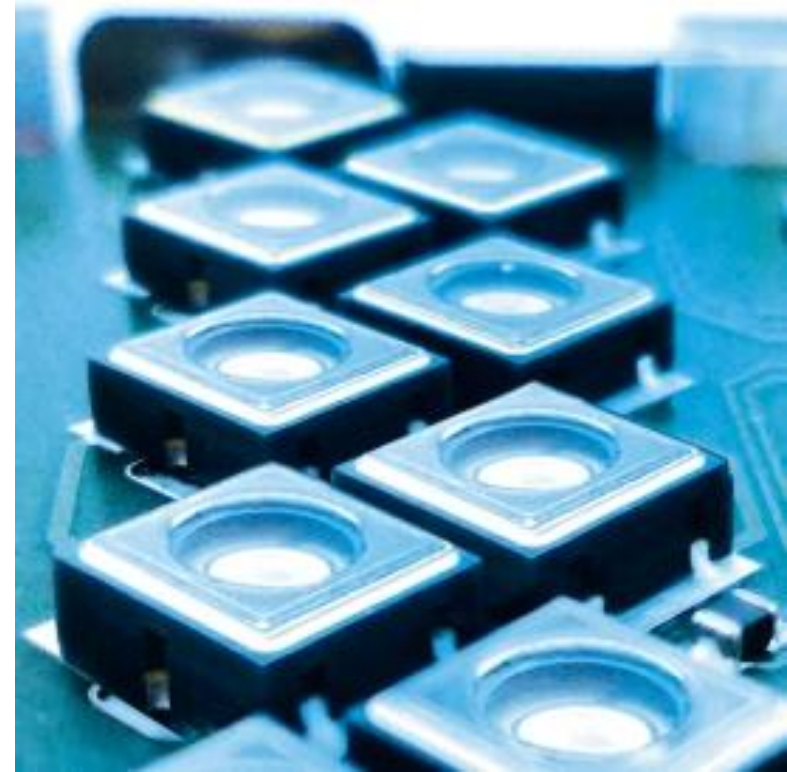
How do we overcome the challenges?



Thijs van den Akker

Agenda

- Introduction Phoenix Contact
- Connections for your:
 - LED driver/control device and rugged LED-PCB's
 - Flexible LED-PCB's
 - (Outdoor) LED armatures



Introduction Phoenix Contact

- Founded in 1923, making connectivity for Trams.
- 4000 employees worldwide
- Total turnover 1,6 billion euro
- 3 Divisions
 - **Device connectors**
 - Industrial components
 - Control and industry solutions

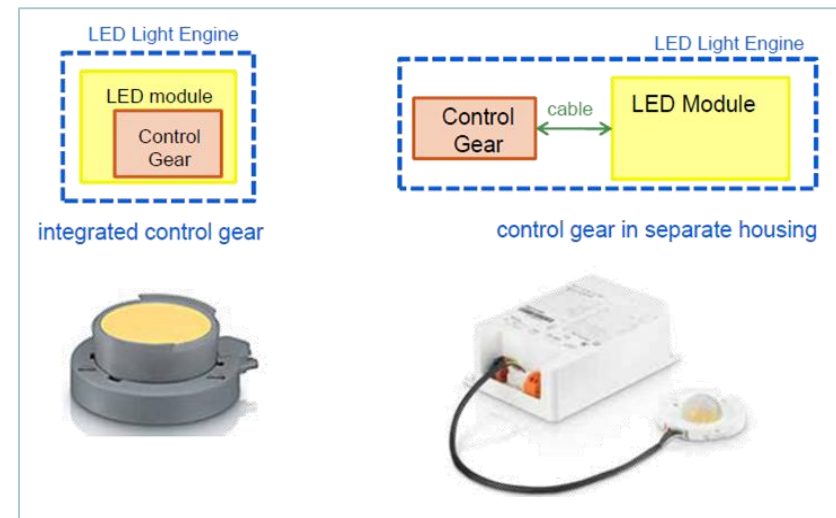


Headquarter Blomberg, Germany



Connecting your LED light engine

- According Zhaga, a LED engine can be build 2 ways:
- #1 Integrated control gear
- #2 Control gear in separate housing
 - Interface cable is not defined by Zhaga!
 - Need for easy, reliable and exchangeable connection

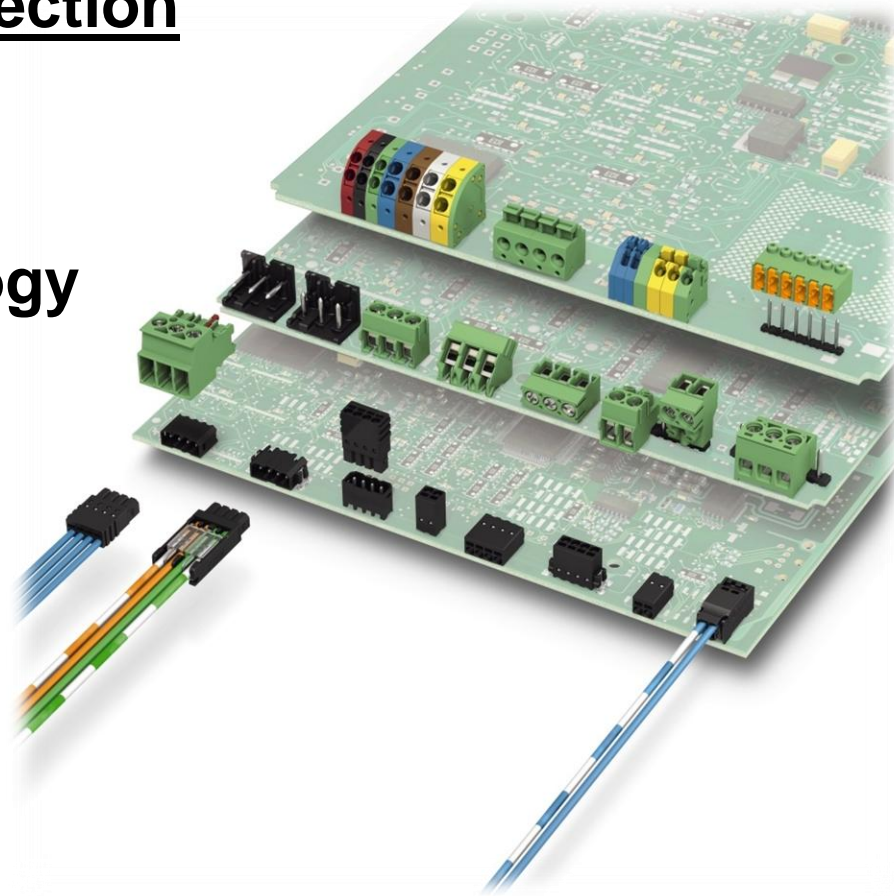
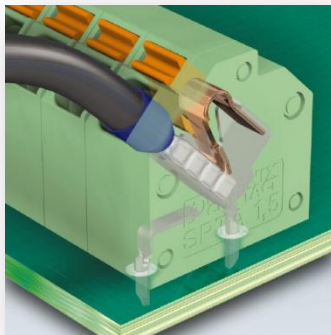


Connecting your LED light engine

You want for your light engine:

- **Reliable, and Easy wire connection**

- Pluggable or fixed
- Double or single connection
- **(Fast) connection technology**
- (Color) coding



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Connecting your LED light engine

You want for your light engine:

- **Fast connection technology**

1. Screw with wire protection
2. Screw with cage lift principle
3. Push-in spring force
4. Insulation displacement (IDC)
5. Spring force



1



2



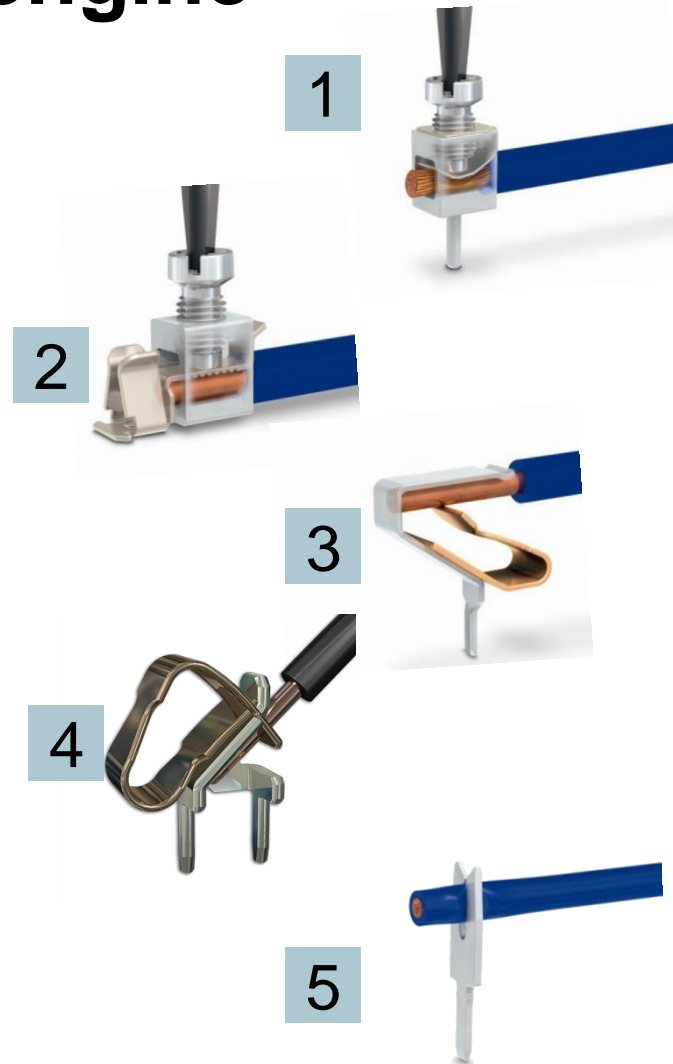
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5



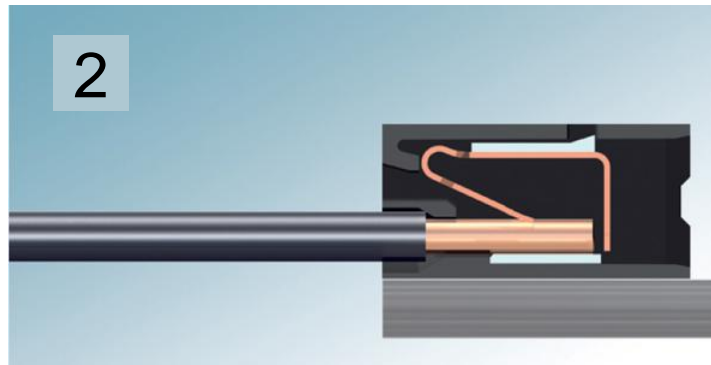
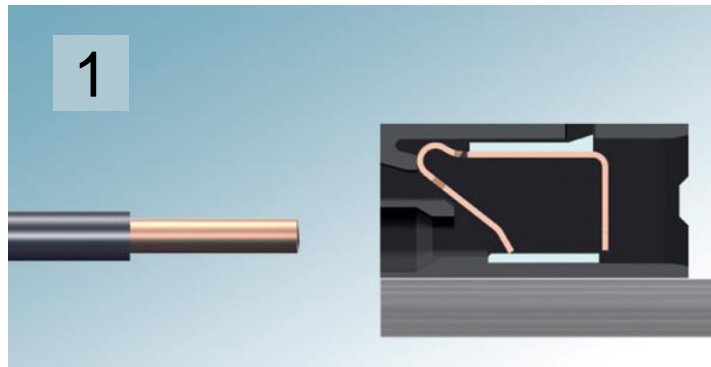
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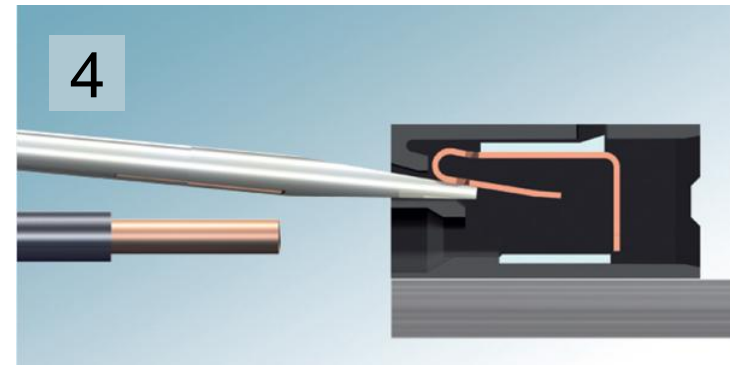
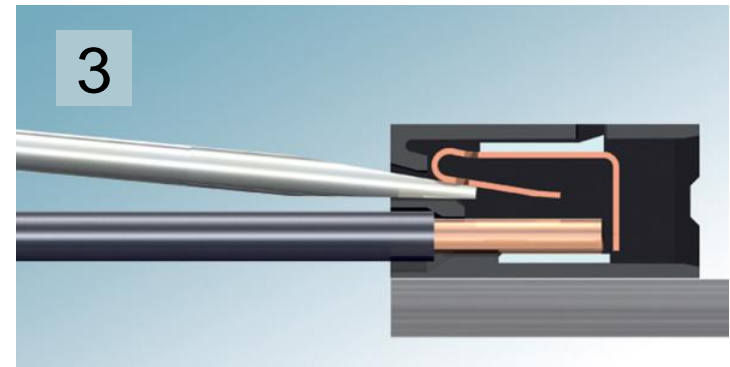
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Connecting your LED light engine

You want for your light engine: Push-in technology



Connection



Disconnection

Connecting your LED light engine

You want for your light engine: Push-in technology

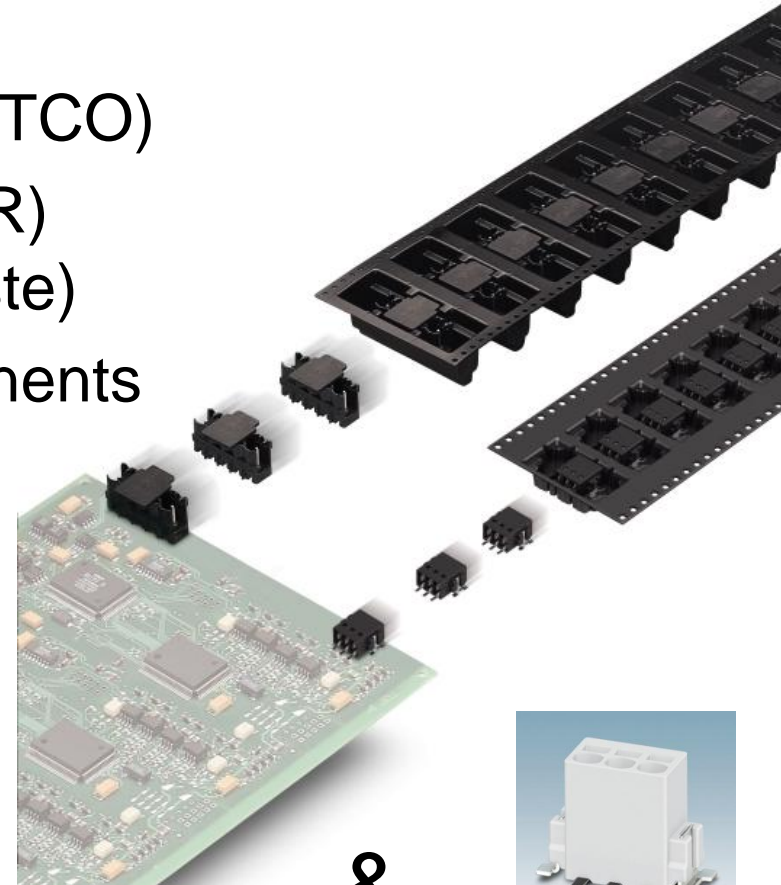
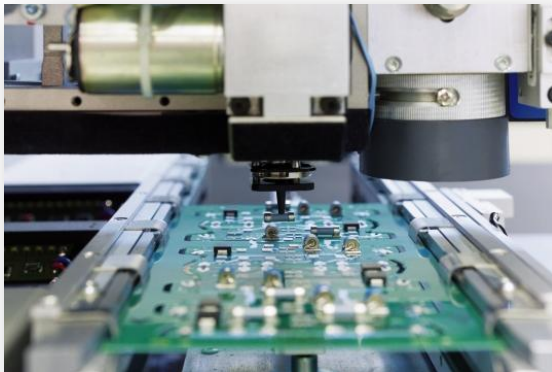


Connecting your LED driver/controller

You want for your light engine:

■ Optimal production proces

- Achieve production optimisation (TCO)
- SMD or Trough Hole Reflow (THR) soldering connections (Pin in Paste)
- (White) High temperature components



&



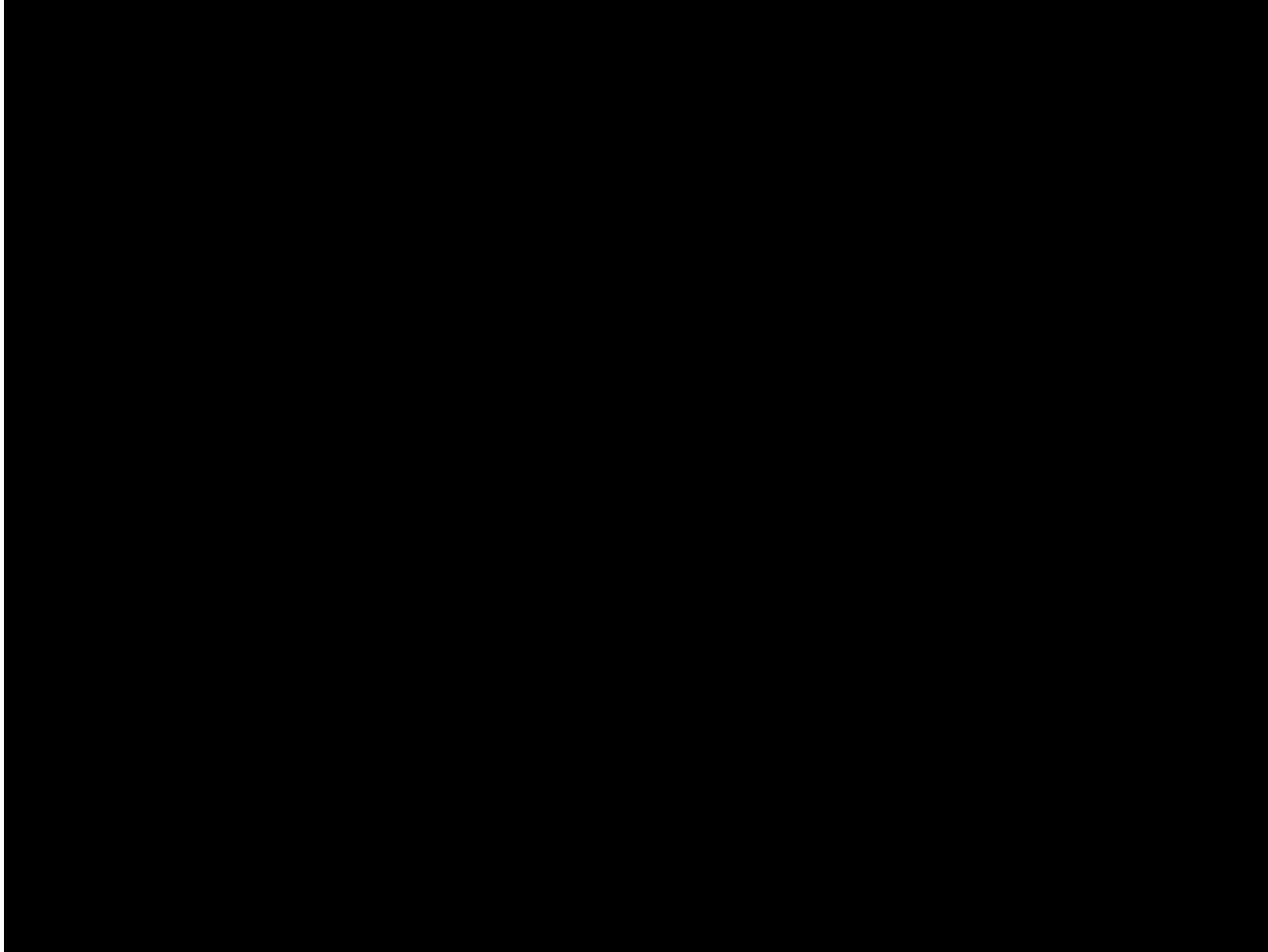
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Connecting your LED light engine

THR (Pin in Paste) principle in a 3 simple steps



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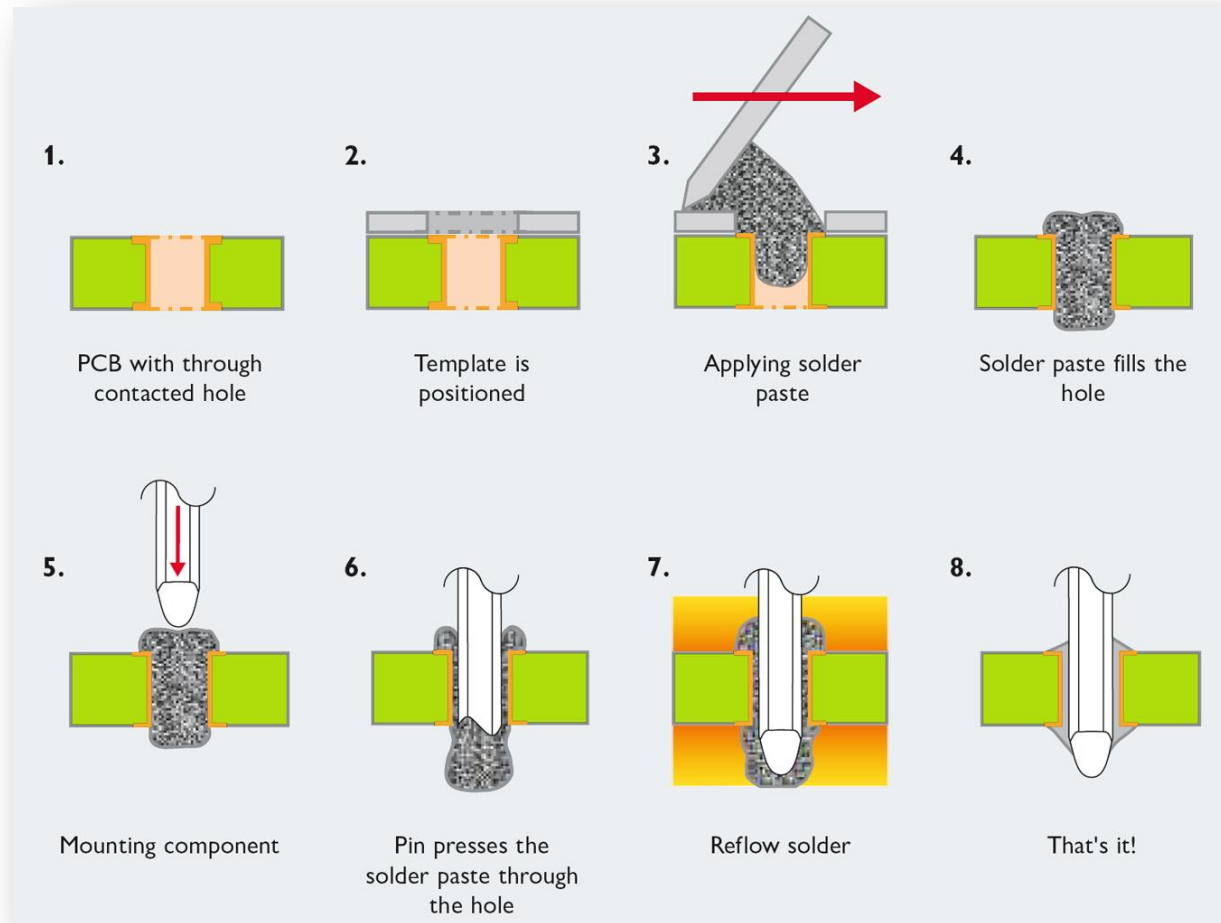
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Connecting your LED light engine

THR principle in a 3 simple steps



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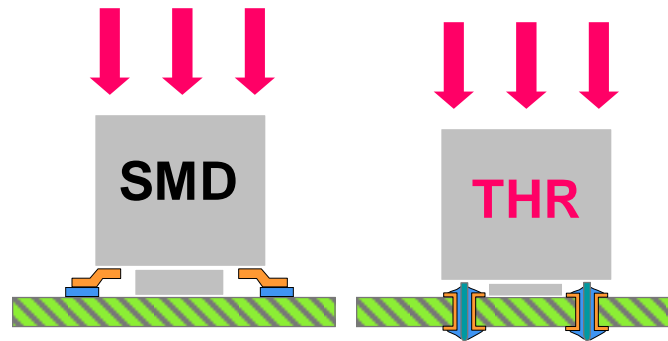
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Connecting your LED light engine

THR principle in a 3 simple steps

THR-components **and** SMD-components are
simultaneously processed

with **same** equipment
with **same** procedures
under **identical** conditions.

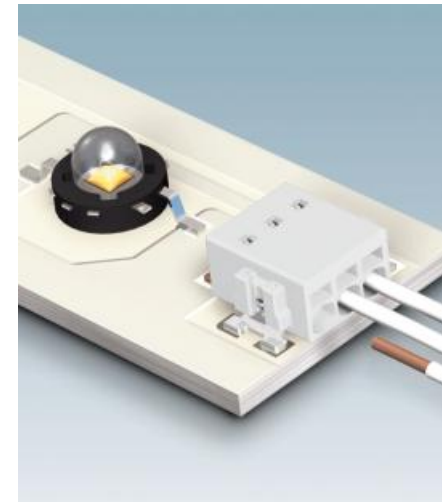


Connecting your LED light engine

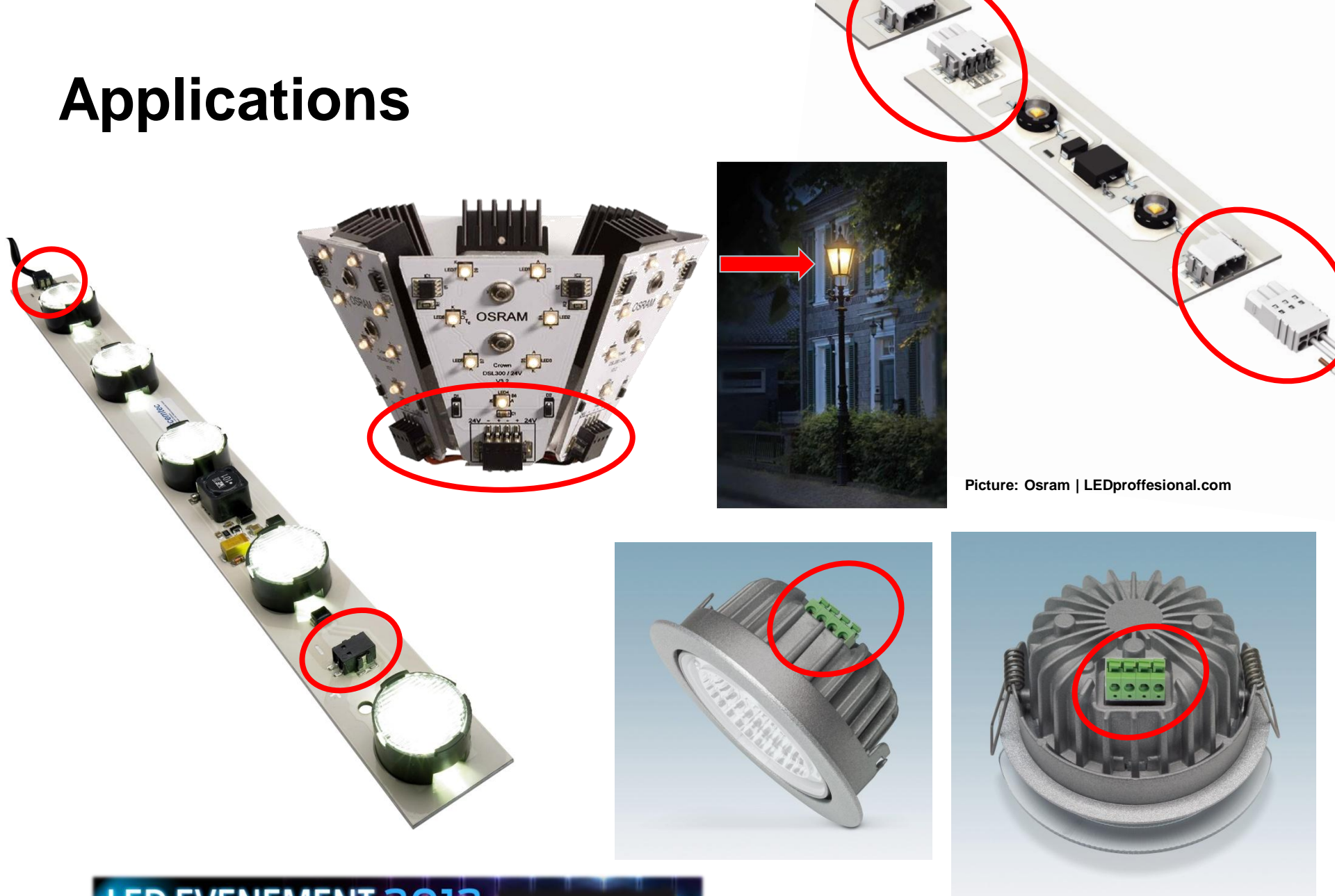
You want for your light engine:

- **Optimal production process benefits:**
- Complete LED-board in one single SMT-production step.
- No defect solder connections anymore
- Flexibility in choice of wire type and length.
- Added value due to easy connection-technology (USP)

Vs.



Applications

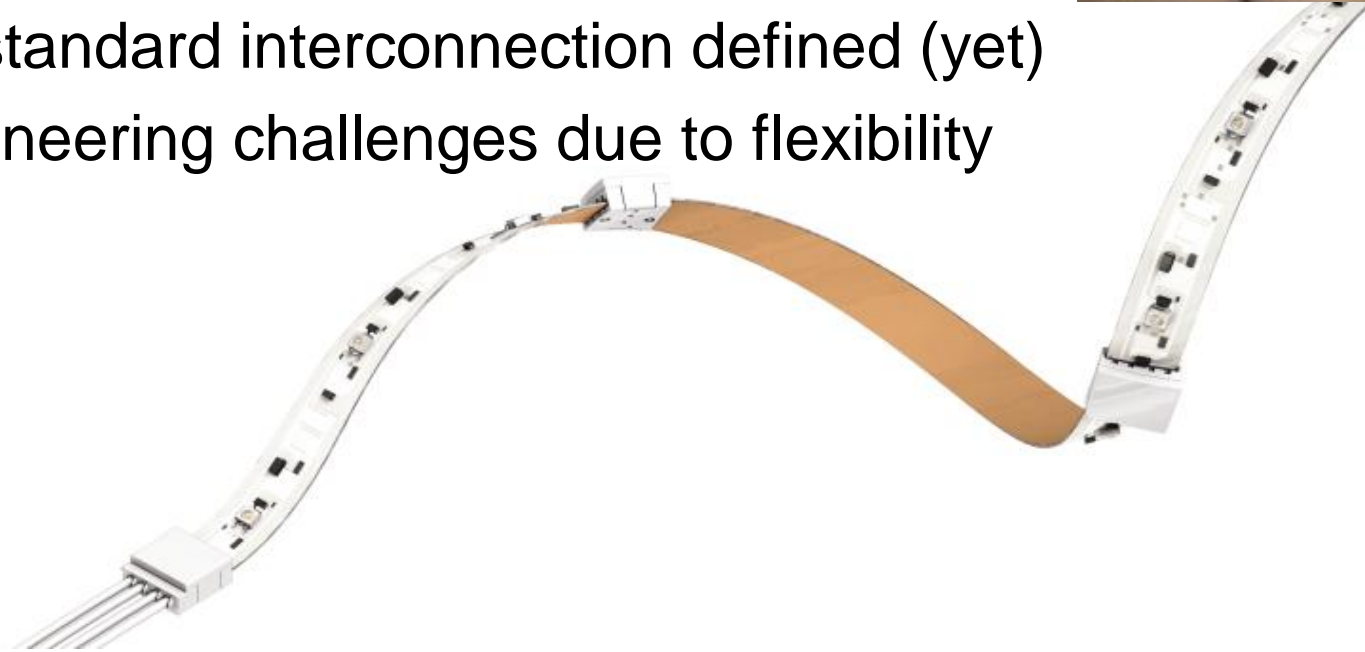


Picture: Osram | LEDproffesional.com

Connecting your Flexible LED-PCB

Upcoming trend, light of the roll..

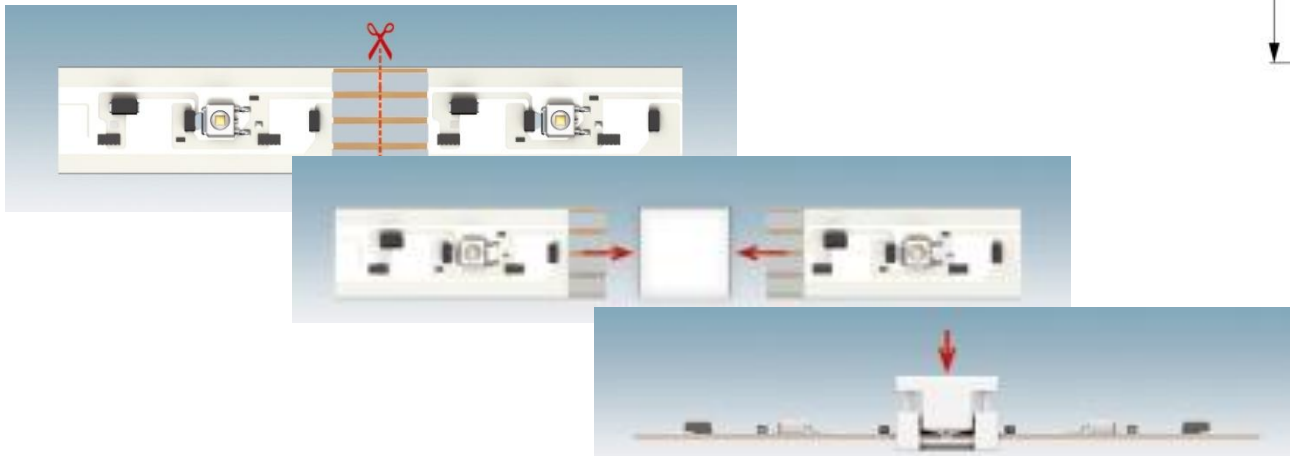
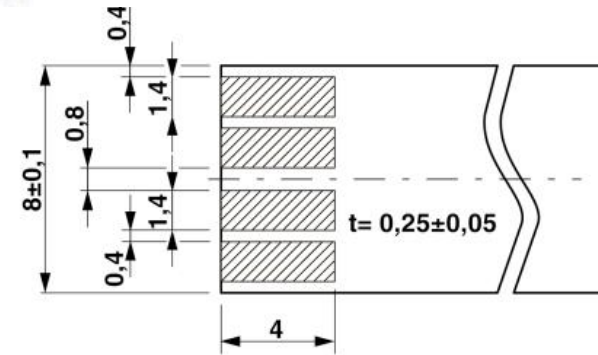
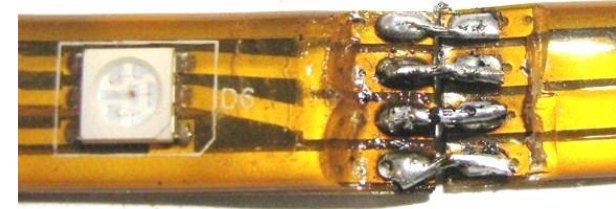
- Budget and professional solutions
- Light output up to 100lm/W
- Power 40-50W/m at 24V
- No standard interconnection defined (yet)
- Engineering challenges due to flexibility



Connecting your Flexible LED-PCB

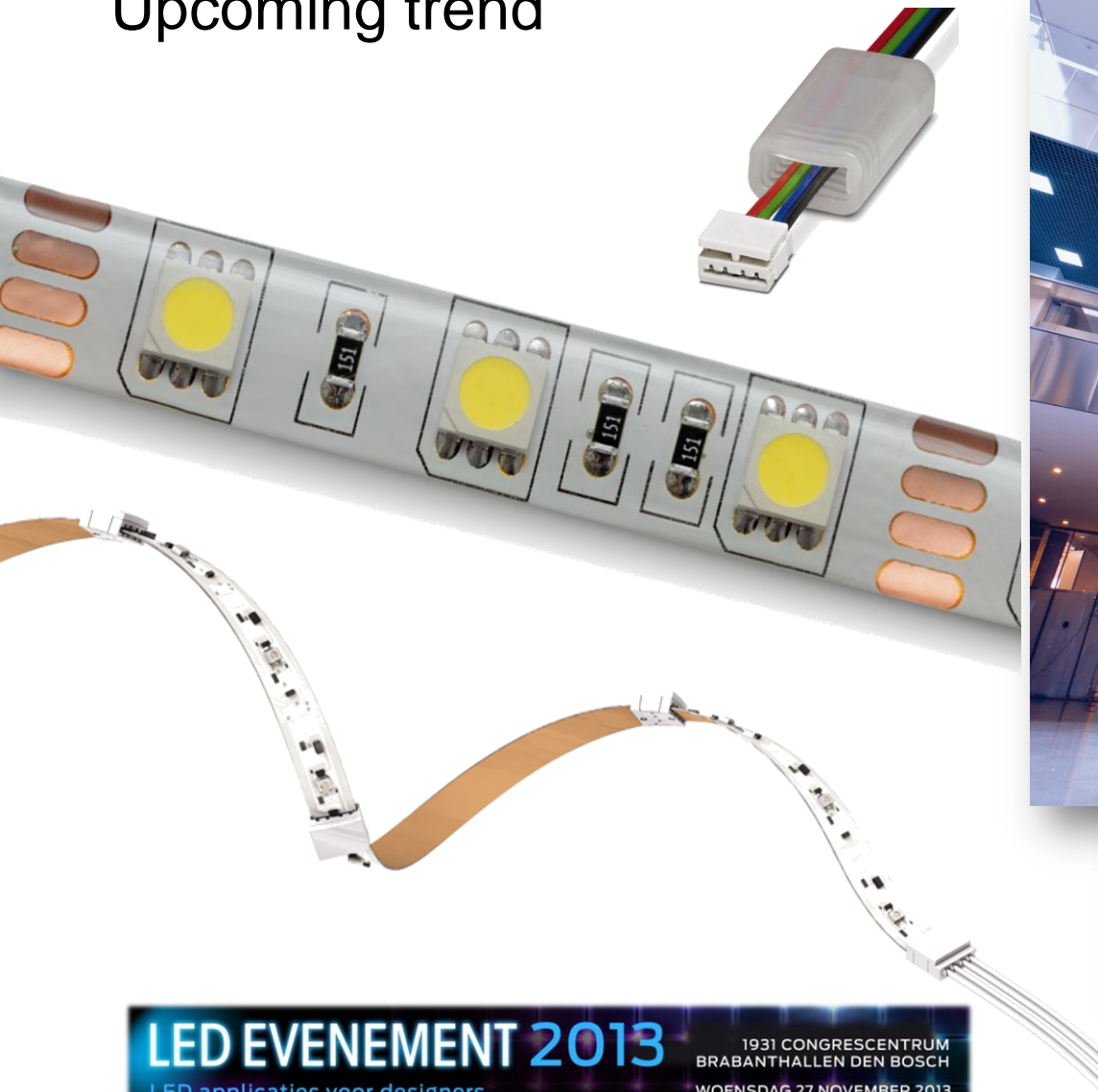
Upcoming trend, light of the roll..

- No standard interconnection defined (yet)
- Development acc. IEC 60838-2-2
- Focus on 8mm wide trips, 2 and 4 poles, wire to board, board to board
- Electrically and mechanically reliable



Connecting your Flexible LED-PCB

Upcoming trend



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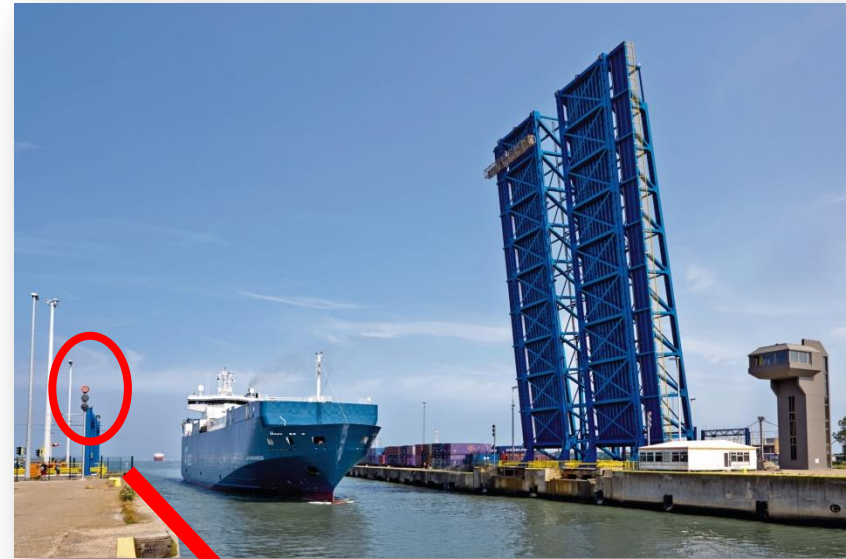


Connecting your outdoor armature

You want:

- **Reliable, and Easy connection**

- A easy to connect armature
- “Fool proof” connection
- Small dimensions
- Suitable IP protection degree



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Connecting your outdoor armature

IP degree

IP-Protection
Classes

IP 6 8

Explanation
of the IP-Code

First Number:
Protection class against
entering of solids
(incl. dust)

- 0 No protection
- 1 Ball with Ø 50 mm must not enter
- 2 Ball with Ø 12,5 mm must not enter
- 3 Rod with Ø 2,5 mm must not enter
- 4 Wire with Ø 1,0 mm must not enter
- 5 Dust that got inside must not affect function and safety
- 6 **Dust must not enter**

Second Number:
Protection class against
entering of water

- 0 No protection
- 1 Dropping water
- 2 Dropping water at housing sloping up to 15°
- 3 Spray water
- 4 Splash water
- 5 Protection against hose water
- 6 Protection against strong hose water
- 7 Protection while being temporarily dived
- 8 **Protection while being permanently dived**
- 9 High pressure and vapor cleaning

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Connecting your “outdoor” armature

Application



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Connecting your outdoor armature

Application



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Connecting your LED application

- Reliable, and Easy connection
- Interesting overall price
- Every design decision counts!



Thank you for your attention!

