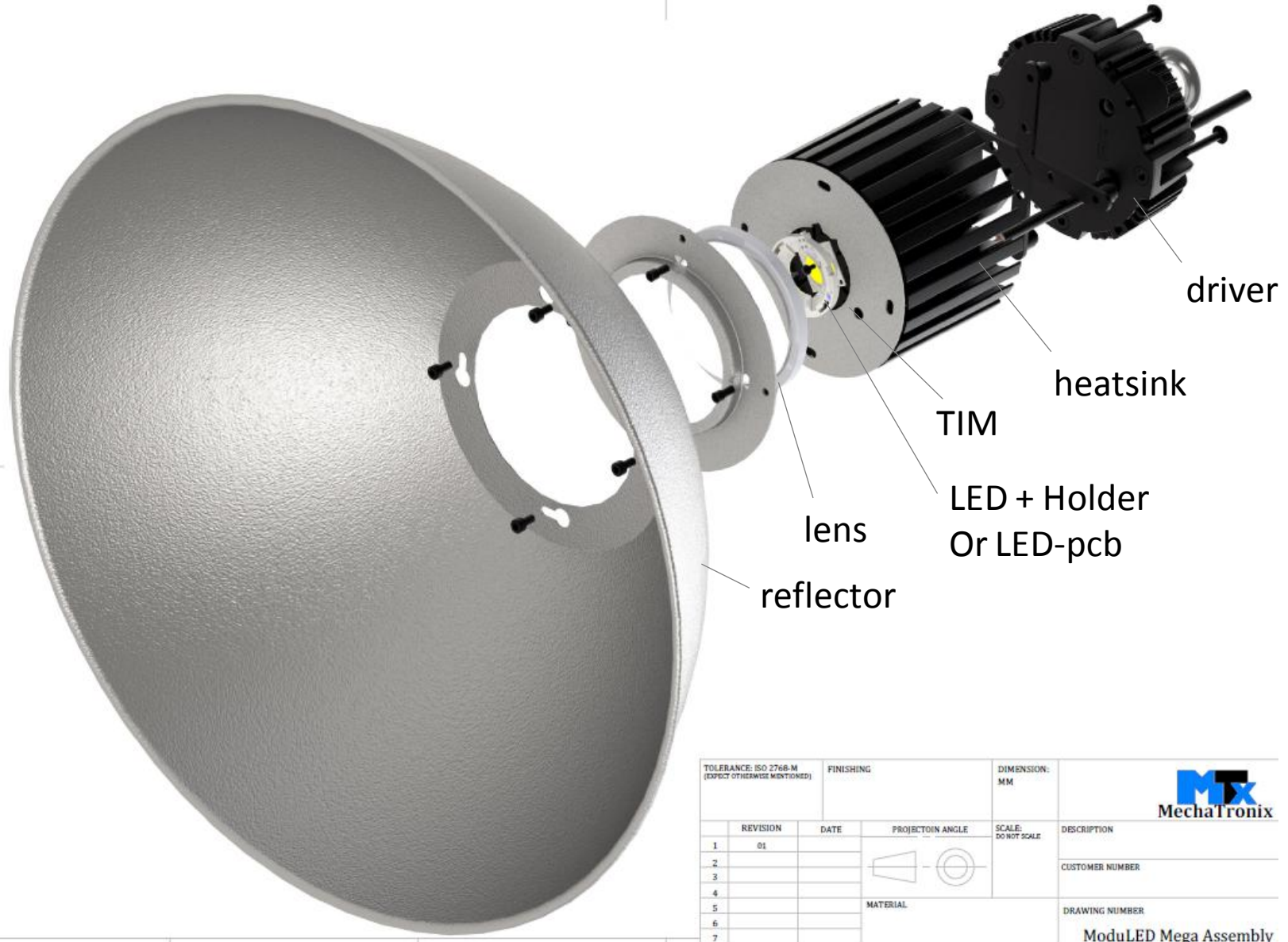




Technology Choices



W.Wissink
THE SAFEST CHOICE
TELEREX

Let's take a luminaire



TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM		 MechaTronix
1	01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	DESCRIPTION	
2					CUSTOMER NUMBER	
3						
4			MATERIAL		DRAWING NUMBER	
5						
6						
7						

ModuLED Mega Assembly

Selection criteria

glare



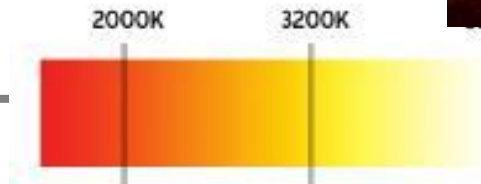
Lifetime



temperature



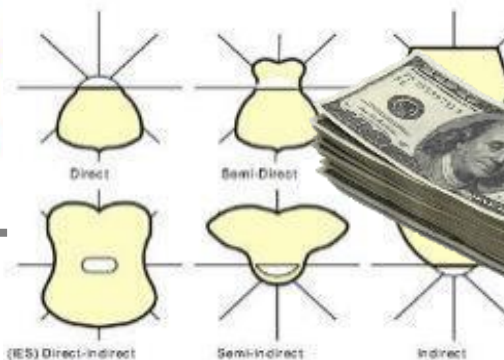
Color
temperature



Tightness



Design



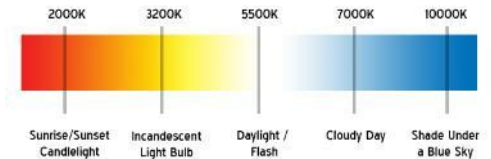
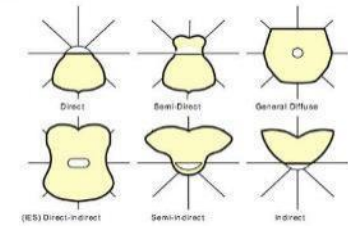
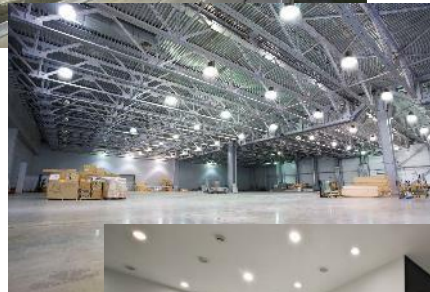
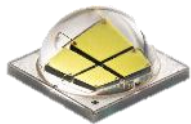
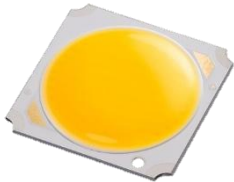
Light
distribution



THE SAFEST CHOICE

TELEREX

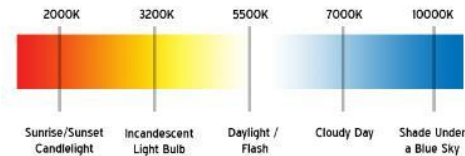
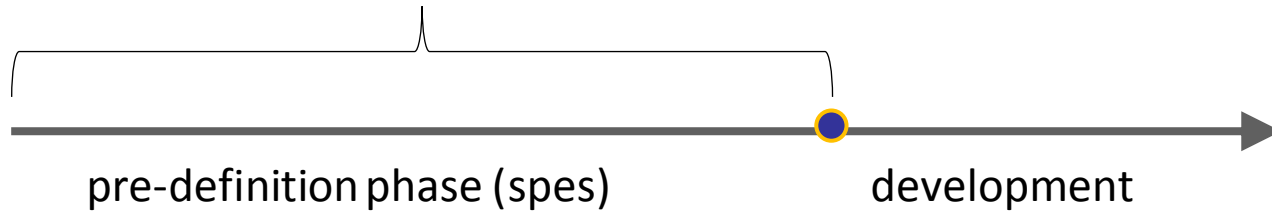
From component to choice



THE SAFEST CHOICE
TELEREX

Questions you should ask

TRUST = SPEED





DESIGN

THE SAFEST CHOICE
TELEREX

Let's take a luminaire

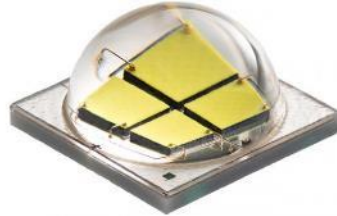


TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM	 MechaTronix
1	REVISION 01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	
2					DESCRIPTION
3					CUSTOMER NUMBER
4			MATERIAL		DRAWING NUMBER
5					
6					
7					

ModuLED Mega Assembly

Lens & reflector

Primary lens



Purpose:

Increasing efficiency in getting the light out of the die

Secondary lens



Possible criteria:

- PMMA standard: $< 85^{\circ}\text{C}$
- PMMA-HT $< 120^{\circ}\text{C}$
- PMMI/TT70 $< 160^{\circ}\text{C}$
- PC (PolyCarbonate) $< 120^{\circ}\text{C}$
- Silicone $< 250^{\circ}\text{C}$

Lens or reflector?



- ☺ For small light sources
- best choice
- ☹ Large = expensive
- ☺ guiding



- ☺ large → cost aspect
- ☹ Low robustness
- ☺ Position LED less critical
- ☺ design

Lens & reflector: application driven

LENS



APPLICATION



CRITERIA

Color mixing



Design
Cost

Robust
IP rating
High lumen

Asymmetric
guidance


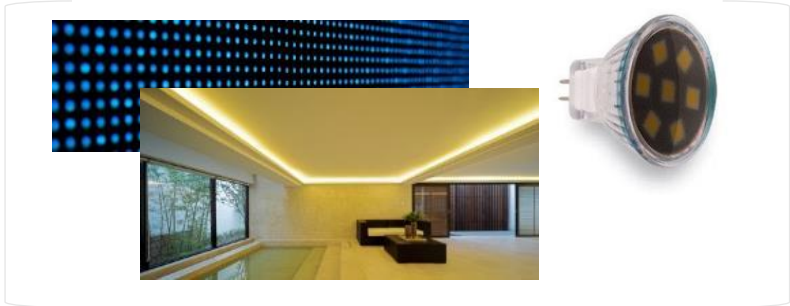


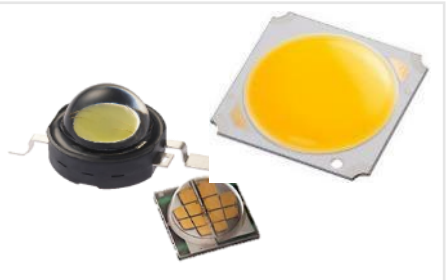

Let's take a luminaire



TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM	 MechaTronix
1	REVISION 01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	
2					DESCRIPTION
3					CUSTOMER NUMBER
4			MATERIAL		DRAWING NUMBER
5					
6					
7					

ModuLED Mega Assembly

LED: offer and criteria

Color rating	Color temperature	Lifetime	Lumenoutput	Price
LOW POWER $\approx 0,1\text{W}$				
MID POWER 0,1-0,5W				
(SUPER) HIGH POWER >0,5W				

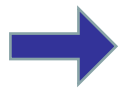
LED: Application retail/shop

Pure white, crisp white



Fluorescent Whitening Agents

- Absorb photons near UV & deep blue
- Re-emitted photons longer wavelength



COB light in deep blue spectrum activates FWA's

LED: Application horticulture

Color

Greenhouses:

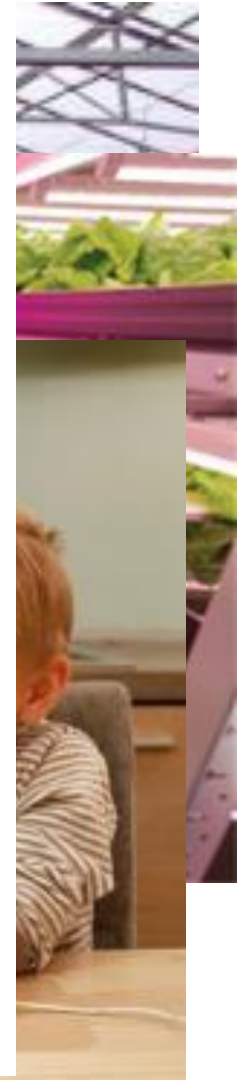
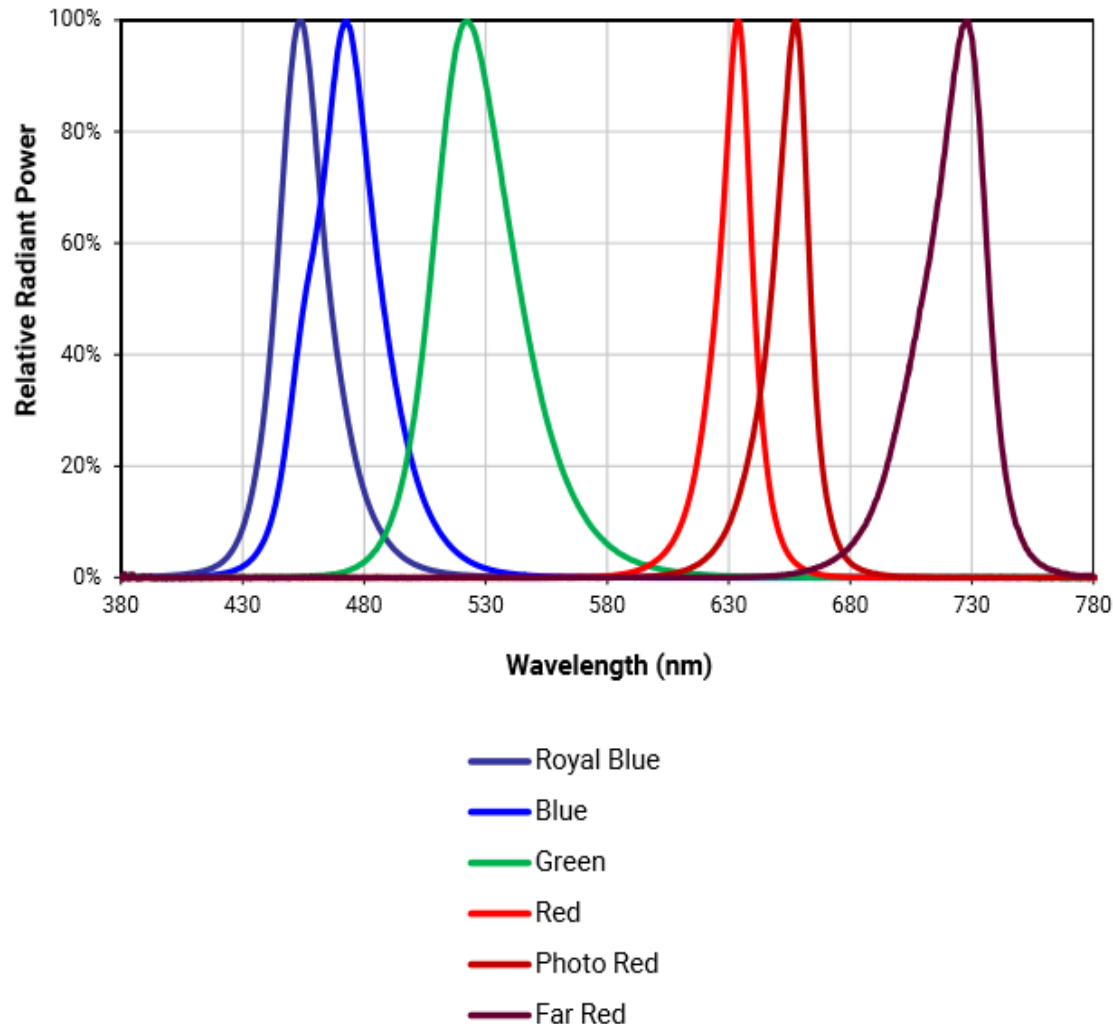
- High distance
- High lumen c
- All types of p vegetables, fl

Vertical Farming:

- Numerous of
- Small plants a vegetables

Consumer:

- Small plants, i food



LED: application healthcare

Low Color Temperature (3000K):

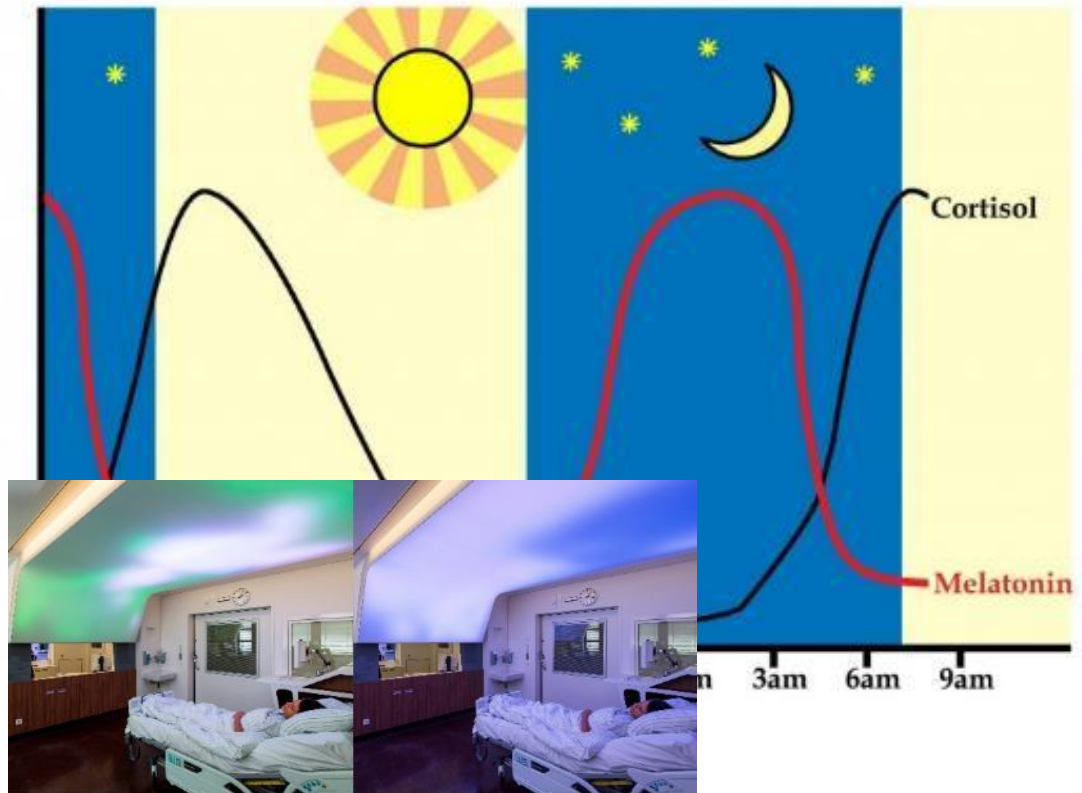
- increase melatonin
- relaxation

High Color Temperature (6000K):

- Suppresses melatonin
- Alertness & productivity



No daylight:

- Daylight simulation
→ alzheimer



Let's take a luminaire



TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM	 Mechatronix
1	REVISION 01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	
2					DESCRIPTION
3					CUSTOMER NUMBER
4			MATERIAL		DRAWING NUMBER
5					
6					
7					

ModuLED Mega Assembly

LED PCB: common technology


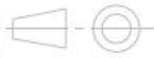
LED Driver/Carriers	FR4	PCB Via's	MCPCB	Al2O3	ALN
Thermal conductivity	0,05 W/m.K	< 7,5 W/m.K	<4 W/m.K	24 W/m.K	170 W/m.K
High Voltage	2000 V	100 V	2000 V	20 KV	15 KV
Application	low power	High power	Mid power	Very high Power	Ultra High Power
Temperature	< 140 °C	< 140 °C	< 180 °C	> 500 °C	> 500 °C
Green/Lifetime	chemical	chemical	polymer	oxides (green)	oxides (green)

This is only an indication materials, because there are more materials available but not used a lot yet !



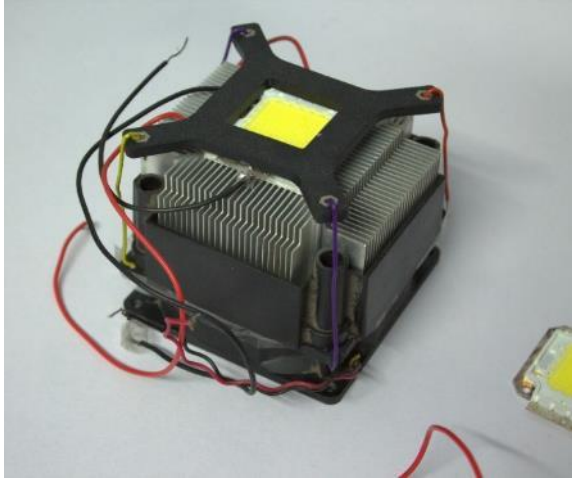
Let's take a luminaire



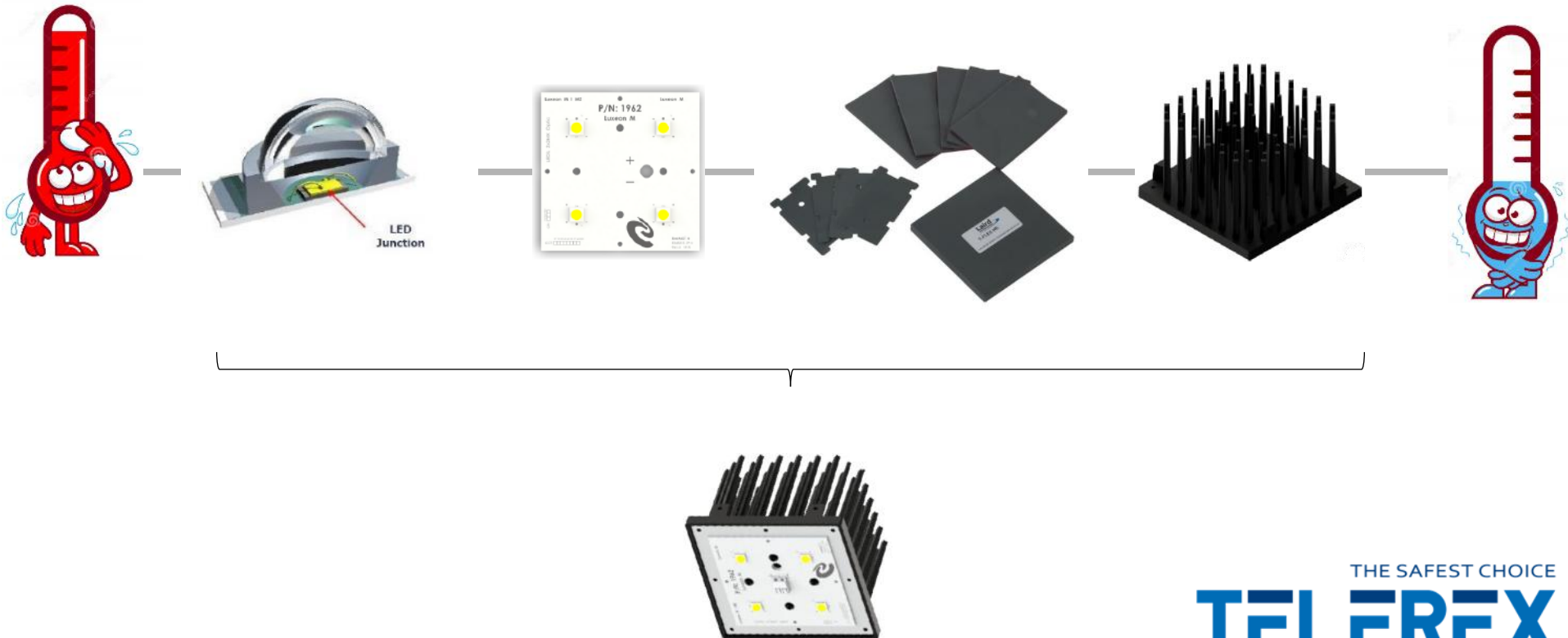
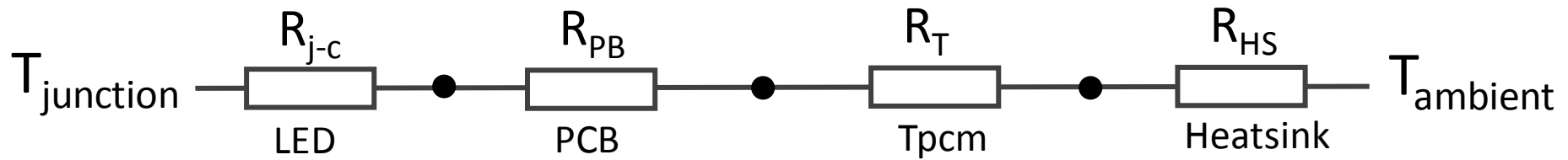
TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM	 Mechatronix
1	REVISION 01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	
2					DESCRIPTION
3					CUSTOMER NUMBER
4			MATERIAL		DRAWING NUMBER
5					
6					
7					

ModuLED Mega Assembly

Heatsink: thermal management

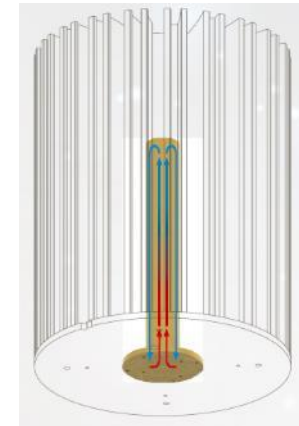
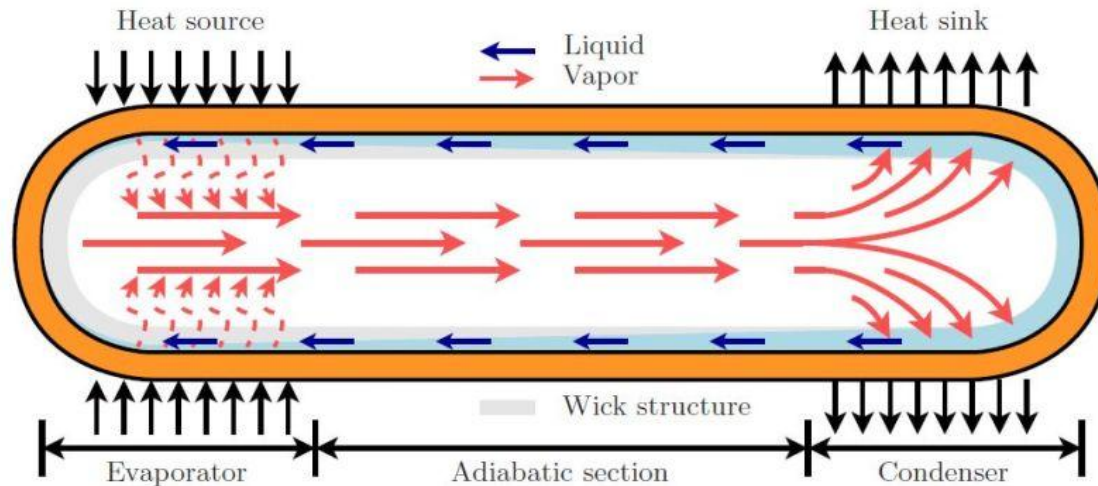


Heatsink: thermal management



Heatsink: design



- Passive cooling: high power with heatpipe



- Active cooling: Fan sink, Liquid, Peltier, synthetic jet,..
 - More used in special industrial environments or applications

Let's take a luminaire

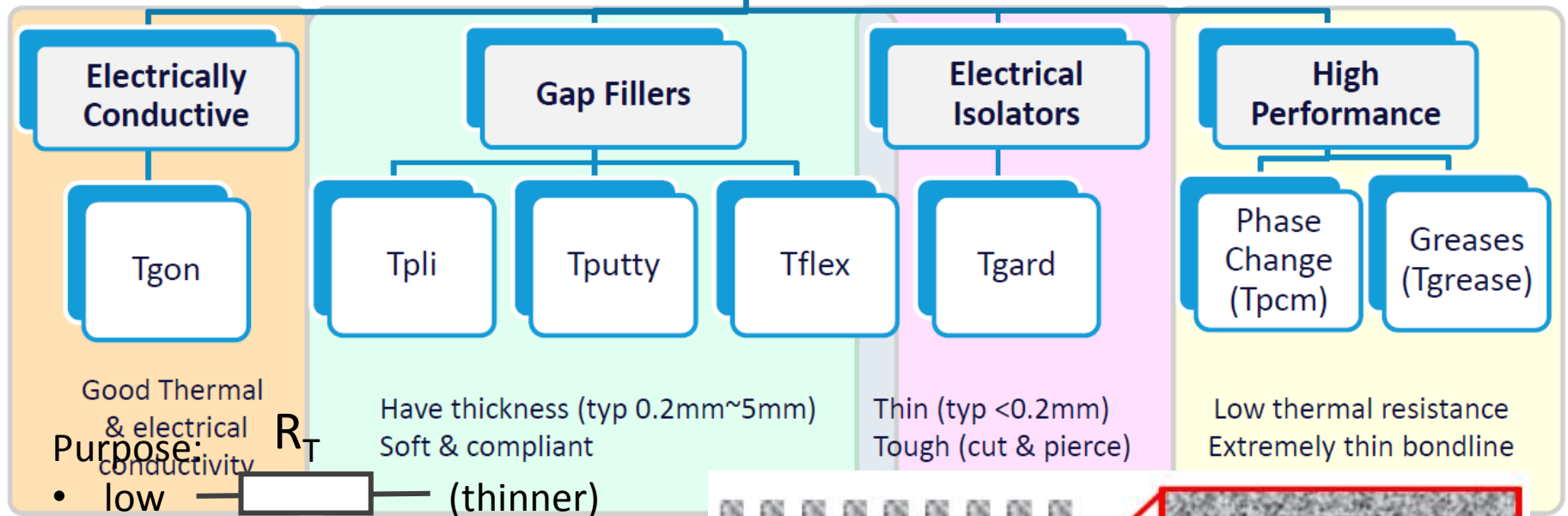


TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM	 Mechatronix
1	REVISION 01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	
2					DESCRIPTION
3					CUSTOMER NUMBER
4			MATERIAL		DRAWING NUMBER
5					
6					
7					

ModuLED Mega Assembly

Thermal Interface Materials (TIM)

Thermal Interface Materials



Purpose: R_T

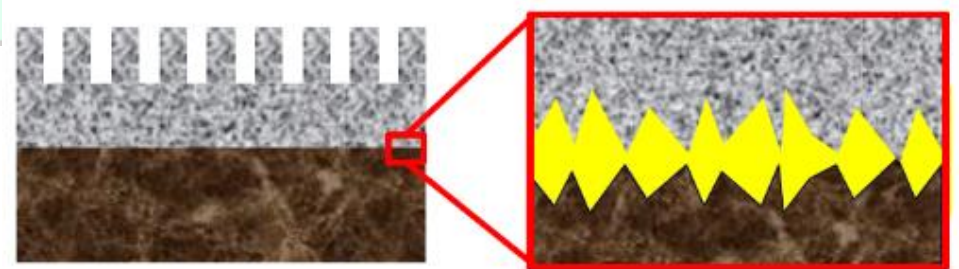
• low

Tpcm

- 2 x thinner \approx 2 x cheaper


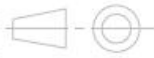
Best choice: **Tpcm-585**

- Handling
- 0,127mm thickness and 3,8W/mK



Let's take a luminaire



TOLERANCE: ISO 2768-M (EXCEPT OTHERWISE MENTIONED)		FINISHING		DIMENSION: MM	 MechaTronix
1	REVISION 01	DATE	PROJECTION ANGLE	SCALE: DO NOT SCALE	
2					DESCRIPTION
3					CUSTOMER NUMBER
4			MATERIAL		DRAWING NUMBER
5					
6					
7					

ModuLED Mega Assembly

the right design for it's application

What happens when using
the product for another
application???