LIGHTING PROGRAM

TÜV RHEINLAND

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INTRODUCTION

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SAGAR PATEL

- LED and Lighting Program Manager; Develop and Manage the program nationally
- Manage the LED/Lighting Lab in Pleasanton, CA
- ~7 years of testing experience
- Work closely with Engineers, Operations and Sales
- Represent TUV on UL's Lighting Standards Technical Panel UL 1598, UL 2108, UL 8750, UL 1838, UL 1993
- Prior to TUV –
  - Sr. Project Engineer, Safety Team Leader and Lighting Technical Lead Nationally at SGS
  - Project Engineer at Intertek

RAHUL MEHTA

- Senior Test Engineer – Electrical Product Safety
- ~6 years of product safety testing experience in UL, CSA , European (EN Standards) and CB Scheme (IEC Standards)
- Work closely with Engineer's, Operations and Sales in Irvine, CA
- Prior to TUV –
  - Engineering Team Leader at Intertek Testing Services NA Inc.

INTRODUCTION

SANDRA KATO

- Southwest Sales Executive in the Electrical Division; Sales Program Manager – Business Development for the LED/Lighting Program
- 18 years of sales; ~8 years in the testing industry and 10 years in PCB and Semi-conductor
- Prior to TUV –
  - National Sales Manager, Lighting Program; Senior Sales Executive in Product Safety, Nationally for SGS
  - Western Territorial Sales for Intertek's Lighting Program selling both Safety and Performance Testing

140 anniversary
1872 - 2012

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BACKGROUND

TÜV RHEINLAND GROUP

- Founded in 1872
- Completed 140 years
- Headquartered in Cologne, Germany
- Employs 17,000 people
- 500 locations in 65 countries

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LIGHTING PROGRAM

Why NOW?

- Servicing lighting customers for many years
- Popular demand by our clients
- Experienced sales force that understands the industry
- Right time in market
- No formalized program was in place……..

LAUNCH OF THE LIGHTING PROGRAM

Our Global Footprint and Aggressive Approach will Reinforce our Recognition in the Lighting Industry !!

WHY LEDs?

DEVELOPMENT OF LEDs

- Evolution in Technology
- LED’s are not limited to Lighting Products, but are also used in Backlighting display, Medical Products, Surgical Head Lights, Laboratory Instruments
- Ban on inefficient and traditional lighting technologies
- Up to 25 times Longer Life than traditional lighting
- Tremendous Energy Savings (Energy Efficient)
- Environmentally Green

LED MARKET OVERVIEW

FACTS AND PREDICTIONS

- The worldwide market for LED components was $13.7b and is expected to grow to $15b in 2017
- The Global LED market is estimated to be worth $25.4b USD in 2013
- Asia is projected to be one of the highest growth regions; It accounts for over 35% of the global lighting market and is expected to rise to 45% by 2020.
- LED lighting – LED replacement lamps and luminaires is estimated at $11.72 billion—an increase of 26% between 2011 and 2012—and it is forecast to grow at a CAGR of 12% over 2012-2017.
- According to the Energy Department, LED lamps and fixtures installed in US have increased 10-fold over the last two years – from 4.5 million units in 2010 to 49 million units in 2012.
- According to DOE forecast, LED lighting will represent 74% of sales in the U.S. general illumination market by 2030

APPLICATIONS

- Fixed Luminaires –
  - Wall Scones,
  - 2x4 Troffers,
  - Chandeliers,
  - pole-lights,
  - outdoor wall washers
  - High bay
- Low-Voltage Lighting System
  - Cove lighting
  - Strips Lights
- Low-Voltage Landscape Lighting Systems
- Stage & Studio Luminaires
- Portable Luminaires –
  - Table Lamp,
  - Floor lamp,
  - Under-cabinet light
- Self-Ballasted Lamps & Lamp Adapters
- Track Lighting
- Submersible/Pool Lights
- Electric Signs – Billboard signs
- EXIT signs
- Hazardous Location Luminaires

EXAMPLES

LED Troffer

Self-Ballasted Lamp

Portable Floor Lamp

Wall Sconces

High-Bay Lighting

Landscape Lighting

Stage and Studio Luminaire

Strip Lights

Track Lighting

Emergency Lighting

ACCREDITATIONS

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ACCREDITATIONS

Standards Council of Canada
Conseil canadien des normes

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SERVICES

- By Locations

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SERVICES - By Locations

Safety	EMC	Performance	Photometry
Pleasanton	Pleasanton	Pleasanton	Gamma Scientific, San Diego
Irvine	Raleigh	Newtown	Shanghai, China
Newtown		Boxborough	
Boxborough		PTL	

SAFETY

COMMON STANDARDS

Product Type	Standards		
Luminaires	UL 1598	CSA C22.2 No. 250.0	IEC 60598-1 & IEC 60598-2-1
Portable Luminaires	UL 153	CSA C22.2 No.12	IEC 60958-1 & IEC 60598-2-4
Low-Voltage Lighting Systems	UL 2108	CSA C22.2 No. 9.0	IEC 60958-1 & IEC 60598-2-1
Self-Ballasted Lamps/Lamp Adapters	UL 1993	CSA C22.2 No. 1993	IEC 60968; IEC 62560
Low Voltage Landscape Lighting	UL 1838	CSA C22.2 No. 250.7	IEC 60958-1 & IEC 60598-2-1/ -7
Stage and Studio Luminaires	UL 1573	CSA C22.2 No. 166	IEC 60958-1 & IEC 60598-2-17
Track Lighting Systems	UL 1574	CSA C22.2 No. 9	IEC 60570
LED Equipment for Use in Lighting Products	UL 8750	CSA C22.2 No. 250.13	IEC 60231
LED Drivers	UL 1310; UL 1012; UL 8750; UL 60950-1	CSA C22.2 No. 223; CSA C22.2 No. 107.1 CSA C22.2 No. 250.13; CSA C22.2 No. 60950-1	IEC 61347-1 & IEC 61347-2-13

EMC

COMMON STANDARDS

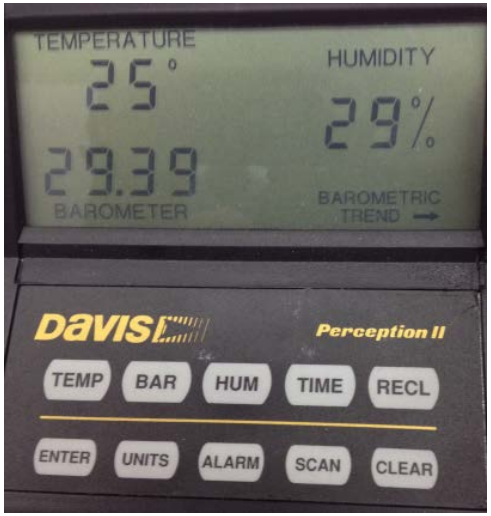
- FCC 47 Part 15/18
- ICES-003 – Lighting products with digital circuits
- ICES-005 – RF Lighting products (Fluorescent & Discharge Lamps)
- IEC/EN 55015 & CISPR 15 – Emissions
- IEC/EN 61547 – Immunity
- IEC/EN 61000-3-2 – Harmonics, class “C”
- IEC/EN 61000-3-3 – Flicker
- IEC/EN 62493 – EMF

Note: EMF testing is needed for lighting products with electronic controls. Compliance with EN 62493 is in effect from February 2013.

PERFORMANCE

TYPICAL TESTS

- Electrical Tests (Current, Wattage, PF, THD, efficiency)
- Ingress Protection (IPXX) Testing for Water and Dust
- In-Situ Temperature Measurement Test (ISTMT)
- Temperature & Humidity Exposure
- UV Exposure
- Vibration Testing
- Mechanical Shock & Impact Testing
- Salt Fog Testing
- Chemical Exposure



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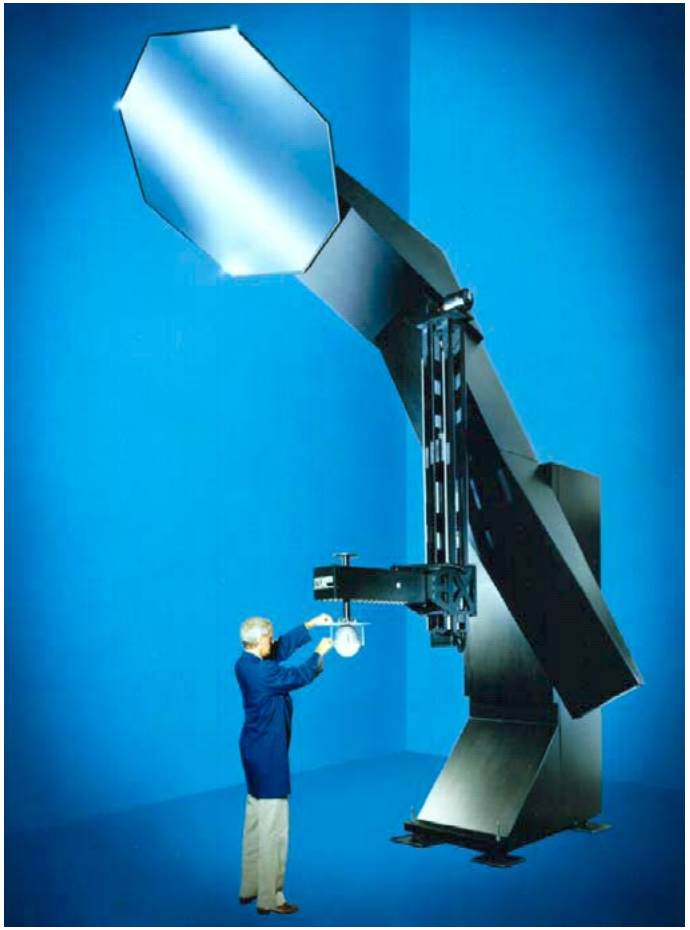
PHOTOMETRY



- Energy Star Certification Body for
  - Integral LED Lamps
  - CFLs
- Common Standards we can test to
  - LM-79 & LM-80
  - LM-65 & LM-66
  - ANSI C78.377
- DLC & LDL

Testing performed in San Diego or Shanghai

QUESTIONS?

UPDATES

UPDATES

UL

- UL 8750
  - LED Lens and Secondary Optics material requirements
  - Temperature measurements where subject to optical radiation
  - Temperature regulated LED drivers (Class P equivalence)
  - Photobiological Safety

- ANSI/UL 8752 – CAN/ULC-S8752
  - Bi-National Standard published in June 13, 2012
  - Safety Standard for OLEDs – Covers OLED Luminaires and OLED Panels integral to other luminaire
  - Installed in accordance with NEC and/or CEC requirements or supplied by other isolated power sources such as battery or PV.
  - Dry or Damp locations only.

UPDATES

UL

- UL 8753 / ULC-S8753
  - Published July 31, 2013
  - Standard for Field-Replaceable Light Emitting Diode (LED) Light Engines
  - Covers LED light engines
    - o Rated up to 347 volts (nominal)
    - o provided with integral lamp bases of other than the screw, bayonet, or pin type configurations typically found on incandescent or fluorescent light sources.

- UL 8754 / ULC-S8754
  - Published July 31, 2013
  - Standard for Holders, Bases, and Connectors for Solid-State (LED) Light Engines and Arrays
  - Does not cover lampholders with screw, bayonet or pin-type bases
  - Does not cover lamp connectors

UPDATES

CSA

- Adoption of the following 5 IEC standards
  - IEC 62031 – LED Modules, Sept. 2013 pub.
  - IEC 62560 – Self-Ballasted LED Lamps, Dec. 2013 pub.
  - IEC 60598-1 – Luminaires: General requirements and Tests, Dec. 2014 pub.
  - IEC 61347-2-13 – D.C. or A.C. electronic control gear for LED modules, Dec. 2013 pub.
  - IEC 60838-2-2 – Connectors for LED-modules, Dec 2013 pub.

- New Standards
  - CSA C22.2 No. 250.4 – Portable Luminaires, Dec. 2013 pub.
  - CSA C22.2 No. 250.570 – Track Lighting, Dec. 2013 pub.
  - CSA C22.2 No. 250.1 – Kits for Retrofitted Luminaires, Jan. 2014 pub.
  - CSA C22.2 No. 74-1 – Discharge Lamp Control Devices, Apr. 2014 pub.

THINGS TO NOTE

QUOTE REQUESTS

PROVIDE INFORMATION

- What is your Intended Market….US, Canada, Europe?
- Types of Models and Variations
- Electrical Ratings and Supply Connection Type
- Luminaire and Lamp Source Type
- Intended Application – High Bay, Down Light, Retrofitting etc.
- Mounting Location
- Any Supporting Documents – BOM, Schematics, Literature
- Product Specification Sheet or Technical Brochure
- Operating frequency of any discharge lamps.
- If LED type lighting fixture, does the LED current operate at above 100Hz
- Does the product have any digital control circuits?

PREP YOURSELF

- Samples
  - Complete set in working condition. Include accessories, mounting means, power supply/driver
  - “Worst Case” model or
  - “Highest wattage” and “Lowest wattage” model to be included if family present
  - When finished product is potted, un-potted samples to be provided.
- Documents
  - Critical Components List (manufacturer, model number, electrical, temperature, flammability ratings, approval information)
  - Installation Instructions
  - Marking Label Artwork
  - Mechanical Drawing of Enclosure,
  - Schematics

Questions and Thank You!