

Use of LED Lighting



Grain Inspection Advisory Committee Meeting

May 17, 2016

**Cathleen Brenner, Technology
and Science Division**



LED Lighting



July 2014 Resolution –

“The Advisory Committee recommends that GIPSA continue its work with updating inspection lab lighting standards. Lab lighting is crucial for proper visual quality analysis. Advancements in LED technology and lower overall cost should prove this technology a suitable replacement for current approved lighting technology.”



Inspection Lighting



Past (1916)



Present

GE F32/T8C75/ECO Fluorescent bulb approved



Equipment Handbook Requirements



Specification	Measurement	
Lamp Radiation	2000 – 2499 Lumens	\geq 2500 Lumens
Correlated Color Temperature (CCT)	7500 °K	7500 °K
Color Rendering Index (CRI)	\geq 92	\geq 87
Illumination*	150 – 200 foot candles (180 optimum)	150 – 200 foot candles (180 optimum)

*Note: Only Illumination measured after installation.

Meter used to measure other specifications in the lab.



Who is Dazor*?



In the Beginning...

- General Electric introduced the fluorescent bulb at 1938 World's Fair.
- Idea was to develop a fixture that could house and easily position the bulb for a task.
- Dazor founded March 2, 1938.

Today...

- Expertise in lighting technologies for visual inspection
- Product designs for compliance to industry-specific lighting standards
- Used in multiple markets, global presence
- Manufactured in St. Louis

*The mention of firm names or trade products does not imply that they are endorsed or recommended by the USDA over other firms or similar products not mentioned.



Lighting Industry Today



- Lighting consumes 20% of global electricity. \$37B annually in USA

Legislation

- DOE estimates 50% annual savings (\$18.5B) by upgrading lighting
- Banning inefficient lighting technologies
- Energy efficiency requirements

Uptake of LEDs underway

- Technology advancements and reduction in payback
- Reduce energy demand and help close energy supply gap
- Commercially viable



Customized LED Solutions



Developed Lights with CCT 7500, CRI > 91: meet Equipment Handbook specifications

Off-The-Shelf LED's Do Not Comply

Task Lighting

- Most efficient delivery
- Plug and play portability



T8 LED Tubes

- Replace FL Tubes
- Ballast Compatible or AC Direct



LED Overheads

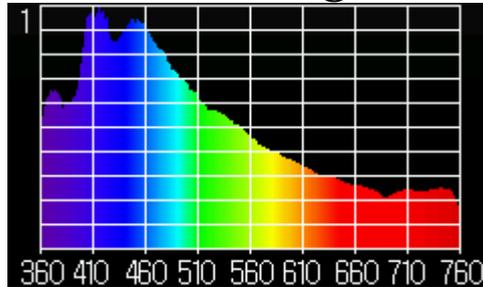
- Replace FL Troffers and HID Fixtures
- Highly efficient



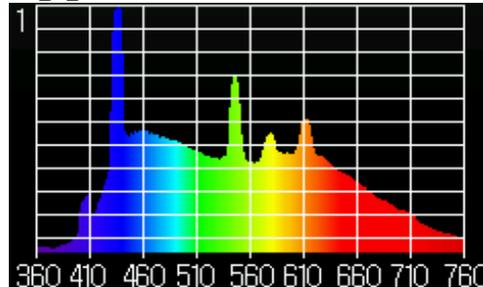
Light sources with CRI between 92 and 98



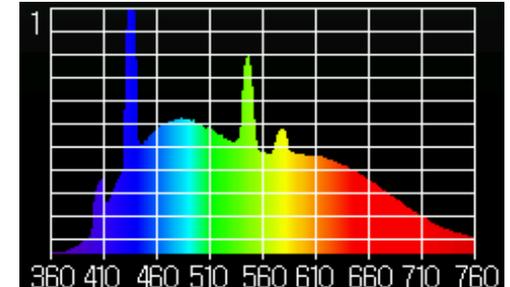
Indirect Sunlight



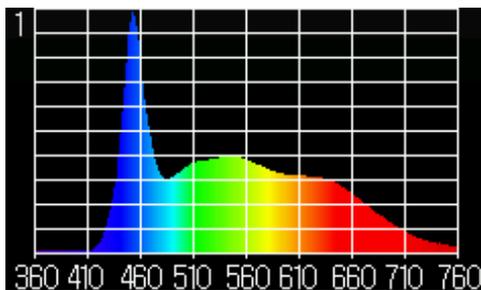
Approved Fluorescent 1



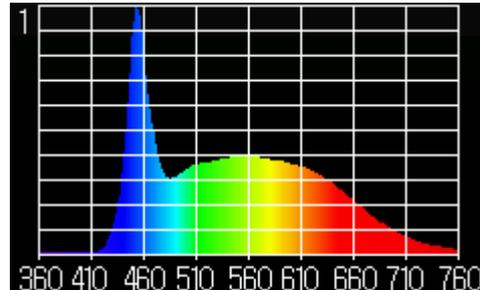
Approved Fluorescent 2



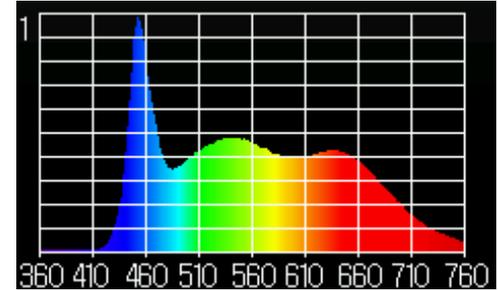
LED 1



LED 2



LED 3



The CCT varies between the different artificial lights.
Differences in the shape of the spectra from each light.



Next steps



- Select samples and factors for testing in consultation with Board of Appeals and Review
- Consult with Dazor and the Canadian Grain Commission
- Finalize test plan and conduct test
- Complete testing and report findings
- Priority for testing:
 - LED lights meeting current Equipment Handbook specifications
 - Determine if specifications should be modified for fluorescent and LED
 - Determine feasibility of using of task lights



Questions?

