



AC/DC LED Lighting Test

Energy & Power Innovation Centre

FUNDER:

Ontario Centres of
Excellence

INDUSTRY PARTNER:
iLLUMA-DRIVE

TIMELINE:

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RESEARCH TEAM:

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KEY STATS:

LED lighting technology has quickly become the lighting standard for new homes in North America

Powering LED's using DC instead of AC power resulted in an increased electrical efficiency of 6% per fixture, an increase in efficacy of up to 25% using high efficiency LEDs and a reduction of flicker by 18 times.

Context: Light emitting diode (LED) lighting technology has been widely commercialized since 2008 due to its energy efficiency and decreasing costs. All modern Canadian residential and commercial construction includes LED lighting as standard fixtures. The focus is now on optimizing energy consumption while maintaining acceptable lighting levels.

Industry Challenge: The Industry Partner developed an innovative low voltage smart control system (CENSE unit) that controls and powers a DC lighting system. They required unbiased third party validation and testing to prove that powering LED's using their DC system is more efficient than powering through traditional AC systems. This data will help with marketing their product and increasing sales.

Solution: Students working at Mohawk College's Energy and Power Innovation Center built a test bed including two setups: (1) a CENSE unit powering LEDs and (2) the conventional AC powered LED bulbs with converters. The test bed was designed to calculate and compare values, including converter/controller efficiency, light efficacy, and light flickering.

Impact of the project: The project results confirmed that powering LED's using the CENSE DC system provided lower losses and higher light quality than LED's powered using traditional AC systems. This data allows the Industry Partner to improve marketing and sales of the CENSE system. New homes can be constructed with the CENSE system pre-installed to reduce energy consumption of homeowners in Ontario.

Mohawk's role: Our students designed and built the test rig used for the validation test, and future LED testing projects to be easily connected and configured to this rig. The tested DC system can be implemented in the Smart Home at the Microgrid facility at the Stoney Creek campus to enable further research on green energy systems.