
Recommendation Letter

Prepared for: Agnetix

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Introduction

Agnetix produces high efficiency liquid-cooled LED lighting for controlled environment agriculture applications. Agnetix fixtures meet the safety, performance and longevity specifications of leading industry standards, are supported with thorough testing and have passed CA Utilities standards through testing performed at UC Davis California Lighting Technology Center. However, due to a lack of testing methods and standards for a liquid-cooled light, Design Lights Consortium (DLC) is not able to test or list Agnetix on their published Qualified Product List (QPL).

Design Lights Consortium

The Design Lights Consortium is a nonprofit company that maintains a Qualified Products List for high efficiency fixtures that meet specific safety, longevity and efficiency thresholds for which they have reviewed and confirmed the source material. Utilities often refer to the DLC specification or the QPL to make decisions for incentive eligibility. The public can generally trust that products that are on the QPL are of high quality. The DLC has two QPLs: the solid state lighting (SSL) QPL with over 560,000 listed products, and the Horticulture QPL with 95 fixtures (as of May 15, 2020).

The DLC's Horticulture QPL does not include all fixture types; liquid-cooled fixtures are absent. According to the DLC, the reason for this is not a judgement of performance, but rather a lack of standardized testing requirements. In their own words: "existing standards rely on assumptions that do not apply to these externally-cooled products (e.g., that a single self-contained fixture with only an external electrical power connection can be evaluated in a closed test environment).¹" DLC also notes "until standards bodies have published a reference test standard for actively-cooled, externally-supplied products (activity for which is currently underway), the DLC cannot qualify products using these methods for its prescriptive QPL²".

The DLC does not assert skepticism over liquid-cooled technology, but rather supports the lighting method by saying that liquid-cooled LEDs "**hold great promise for increased efficacy and lifetime, as well as the ability to more efficiently move and use waste heat in an enclosed facility³**".

The DLC's horticulture specification outlines testing and reporting thresholds for: (1) product longevity, (2) safety, and (3) performance efficiency. (1) Longevity tests are measured based on the testing results of the fixture component parts, specifically the LEDs and the power drivers. (2) Safety is based on whole fixture testing results from third party labs that certify compliance with electrical safety standards outlined by Underwriters Laboratory. (3) And performance standards measure the photometric output of the entire fixture relative to the power draw of the entire fixture.

^{1,2,3} https://www.designlights.org/default/assets/File/Horticultural/DLC_Horticultural-Lighting-Resources_Active-Cooling.pdf

Statement of Compliance With Specification

Seinergy has reviewed tests performed on Agnetix A3 fixtures. Based on Seinergy's evaluation, Agnetix A3 horticulture fixtures meet the DLC product specification's requirements with regard to all criteria: safety, longevity and efficiency. With established testing protocols in place Agnetix A3 fixtures would qualify for listing on the DLC's Horticulture QPL.

Safety. Safety criteria on the Agentix A3 is validated by Intertek and the ETL mark for meeting all UL specifications.

Longevity. Longevity of the Agnetix A3 fixtures is demonstrated by 3 methods: the 5 year warranty, the tested useful life of the LED component parts (L90 of >36,000) and the tested useful life of the driver (>50,000 hours).

Performance. Performance of the fixture is validated by demonstrating compliance with the prescribed DLC thresholds for: whole fixture efficiency in excess of 1.9 umol/j (based on third party goniophotometer LM79-79 IES Approved Method results), fixture power factor exceeding 0.87, demonstrated driver and whole fixture temperature stress testing, and driver total harmonic distortion of less than 0.25.

Basis for Qualification

The table below summarizes the key qualifying criteria for the fixture and its component parts.

			Qualification	Threshold	Comment
Fixture	A3 1200 DD	Performance	Fixture Efficiency; PPE	>1.9 umol/j	PASS
		Longevity	Warranty	5 year, parts and labor	PASS
		Performance	Power Factor	.87-1.0	PASS
		Performance	Temperature Stress Test	ISTM tested	PASS
		Safety	Testing to UL Standard(s)	UL 1598	PASS
LED	Samsung LH351B	Longevity	Flux degradation; lifetime	Q90 >36,000 hrs	PASS
	CREE XPE				PASS
	CREE CTE				PASS
DRIVER	Agnetix Proprietary Driver Power Supply	Performance	Total Harmonic Distortion Current	THD: 0-0.25	PASS
		Longevity	Driver Lifetime	>50,000 hrs	PASS

Furthermore, prior to the existence of the DLC Horticulture list, Agnetix A3-1200 were reviewed by and approved for incentive payments for PG&E and Southern California Edison based on thorough review by the UC Davis California Lighting Technology Center (www.cltc.ucdavis.edu).

Professional Credentials of Author

Seinergy is an energy and utilities consulting firm that specializes in policy and program management related horticulture rebates from electric utilities. Seinergy has completed over 80 horticulture rebate applications since 2015, amounting to over \$7 million in utility program funding approved for customers. The vast majority of these successful applications did not rely on the DLC specification or QPL. Seinergy CEO, and author of this memo, Bob Gunn is a Certified Energy Manager (certification number 19,400) through the Association of Energy Engineers since 2012, and has worked directly with or for electric utility energy efficiency programs since 2008.
