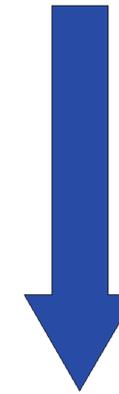


Recommended Protocol for Accelerated Aging Testing: A Literature Review for Protocol Development

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ACCELERATED AGING TESTS OF PV MODULES			
	ACCELERATED QUALIFICATION TESTING	ACCELERATED COMPARATIVE TESTING	ACCELERATED LIFETIME TESTING
Design Quality and Confidence	Minimum*	Medium**	High***
Objective	Minimum testing for reliability/durability of specific module design	Extended qualification testing to compare relative reliability/durability of multiple designs	Site (and configuration) specific testing or worst case site (s) testing of any specific module design
Cost and Time	Low	Medium	High
Goal	Introduce the specific design in the market	Compare (to improve/purchase/invest) multiple designs	Predict lifetime and/or protect warranty
Testing Protocol	Test standards exist	Tester defined protocols exist but a uniform protocol is needed	None publicly exists, if any. Needs a comprehensive understanding on failure mechanisms, failure modes and mathematical models to develop an appropriate testing protocol
Test requirement	Pass/Fail (>5% P _{max} drop = Fail)	Relative power loss for a specific stress time or relative stress time for a specific power loss	Identify ultimate failure mode and/or to determine/substantiate warranty period
User	Manufacturers/Consumers/Investors	Manufacturers/Consumers/Investors	Manufacturers

CURRENT STUDY			
Literature search and review on failure mechanisms	Literature search on failure modes	Literature search and review on mathematical models	Literature search and review on potential accelerated testing protocols to simulate the failure mechanisms and ultimate failure modes



FUTURE WORK NEEDED
Develop an appropriate accelerated lifetime testing protocol
Design and execution of preliminary experiments
Develop initial mathematical models
Validate and improve mathematical models through detailed experiments
Develop "Recommended Protocol for Accelerated Lifetime Testing"

