



# LG Solar, Module Testing

LG MonoX<sup>®</sup> 2

LG NeON<sup>™</sup> 2



# LG's manufacturing process & testing excellence



**LG solar panels are built to a very high quality standard**

**They are tested rigorously during design and production**

**All input materials for panels – from aluminum, to glass & silicon – undergo regular quality control processes**

**LG expects its panels to be identical so the allowable variances are minimal**

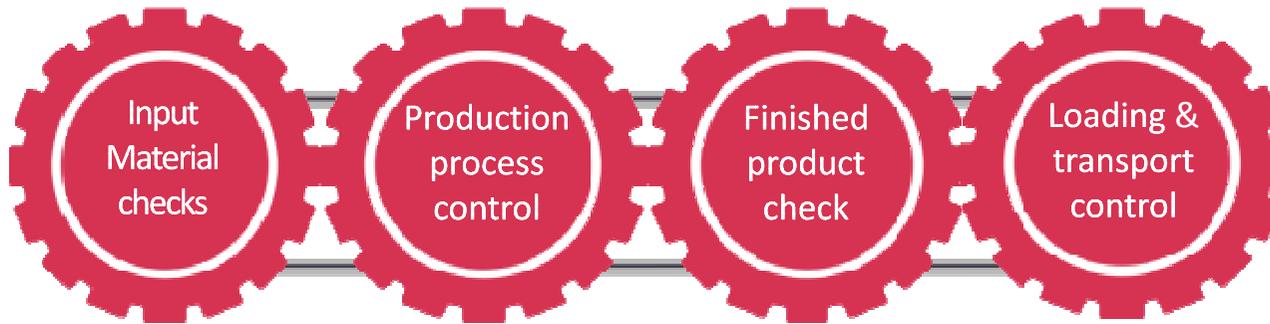
**In Australia, from 300,000 panels installed between 2011 & August 2016, only 2 panels have been returned. Worldwide, the return rate is less than 10 in 1 million**



# LG's quality control systems



**More than 500  
quality control  
processes and  
tests applied to  
every module**



Ongoing input material testing

2 x 100% EL Test

Reliability sampling test every month

Each module's data stored for 30yrs in LG system for 100% traceability



# Long term performance security



LG modules pass key longevity tests

**PASS** for VDE registration



**PASS** for PID Test



**PASS** for Salt Mist Corrosion Test



**PASS** for Ammonia Resistance Test



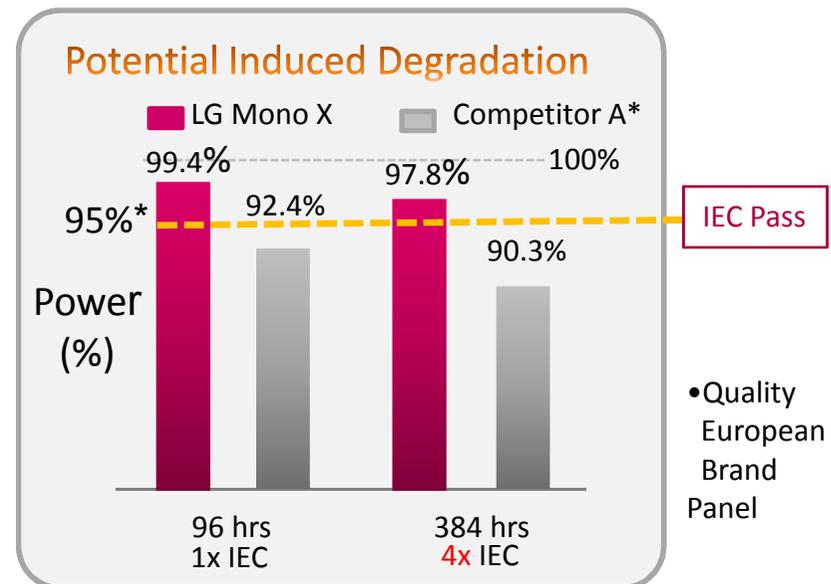
# LG Quality Control - PID\* Test

LG Mono X<sup>2</sup>



\* Potential Induced Degradation is a power degradation from exposure to High Voltage Stress.

At the internal PID test, LG tests 4x the IEC standard.



# LG Quality Control - Damp Heat Test

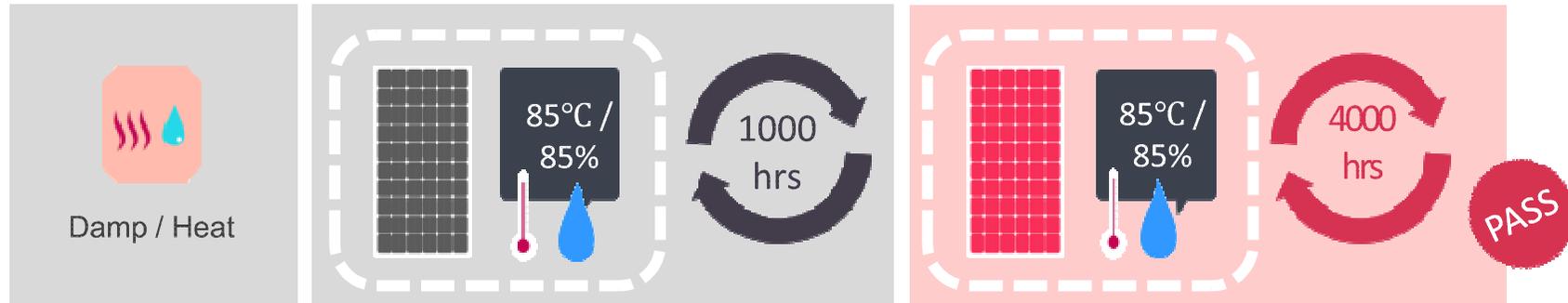
LG NeON<sup>2</sup>  
LG MonoX<sup>2</sup>



Test

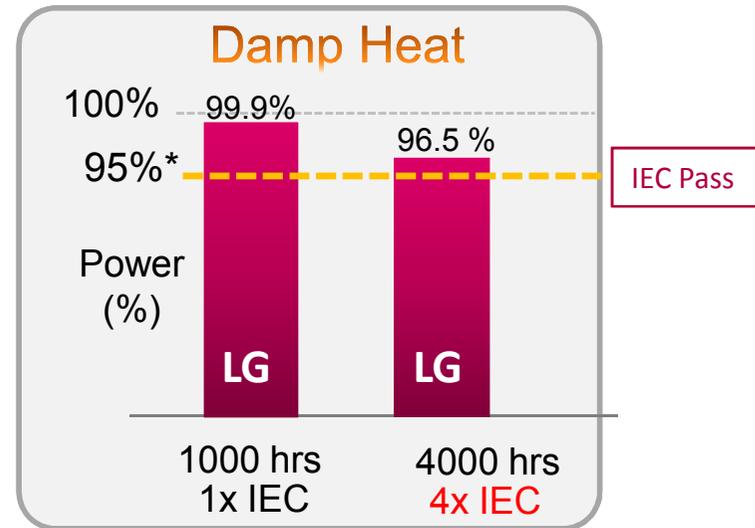
International Standards (IEC)

LG Test



The Damp / Heat test is designed to evaluate a module's performance under high temperatures and high humidity.

LG's Damp Heat Test consists of **4 x IEC standard** being 4000 hours.



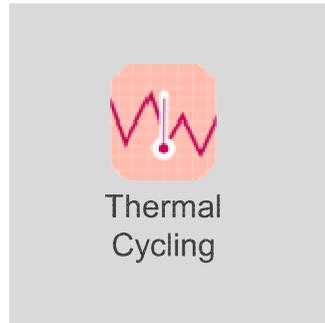
\* Criteria of 1x IEC standard for pass



# LG Quality Control - Thermal Cycle Test

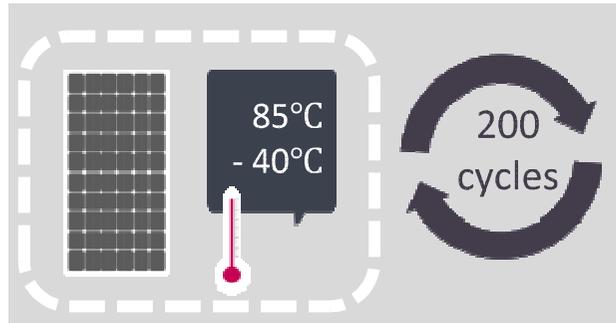


Test

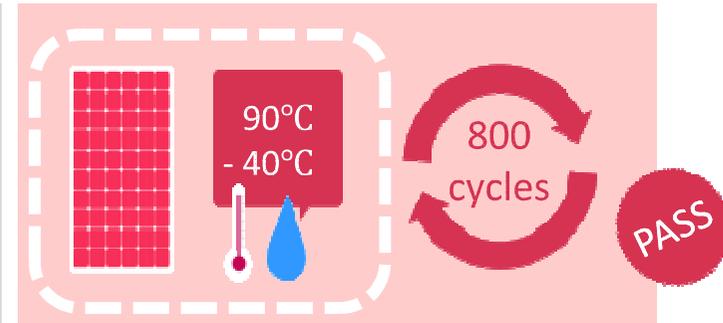


Thermal  
Cycling

International Standards (IEC)



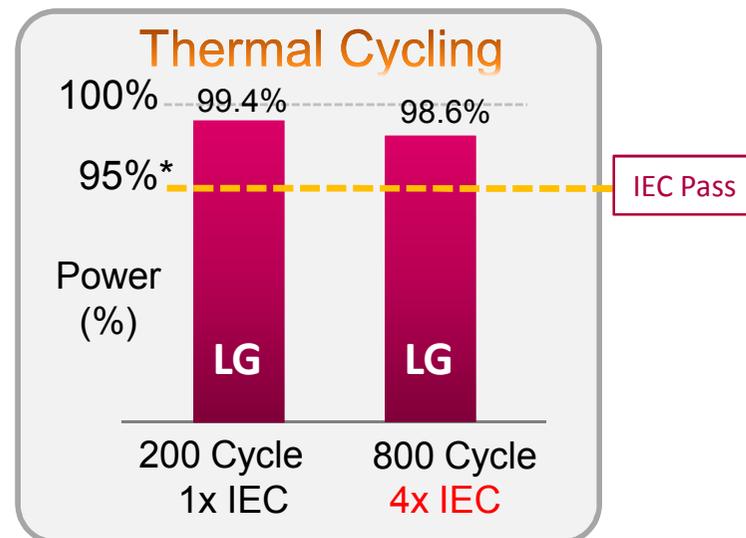
LG Test



Many manufacturers test their panels to pass IEC standards

LG tests its panels **4x** the IEC standard to ensure maximum longevity

At the Thermal Cycling Test LG also tests to **higher temperatures** than IEC standards

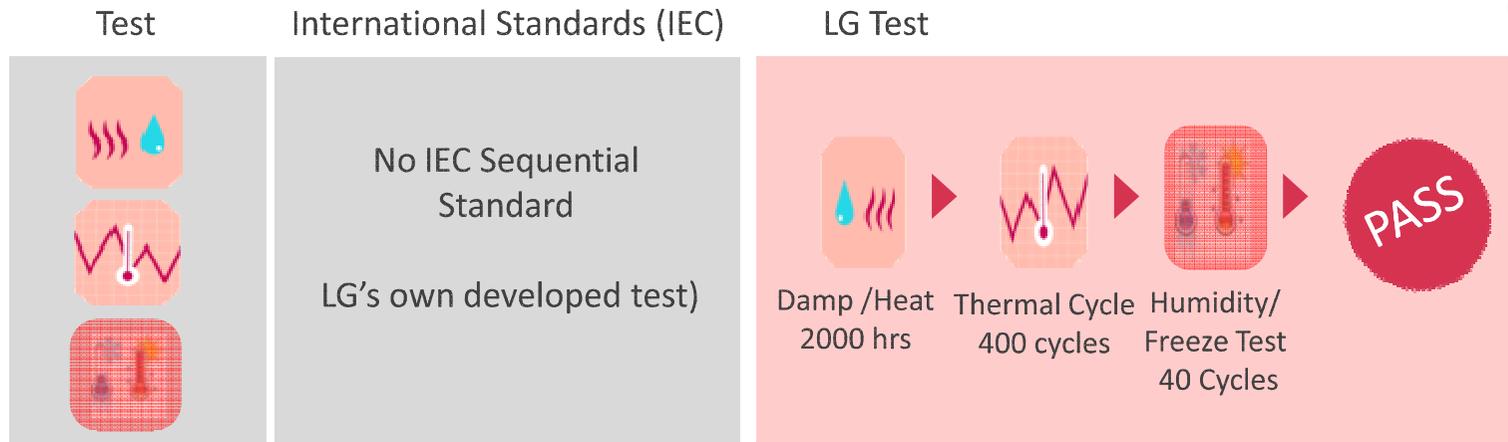


\* Criteria of 1x IEC standard for pass

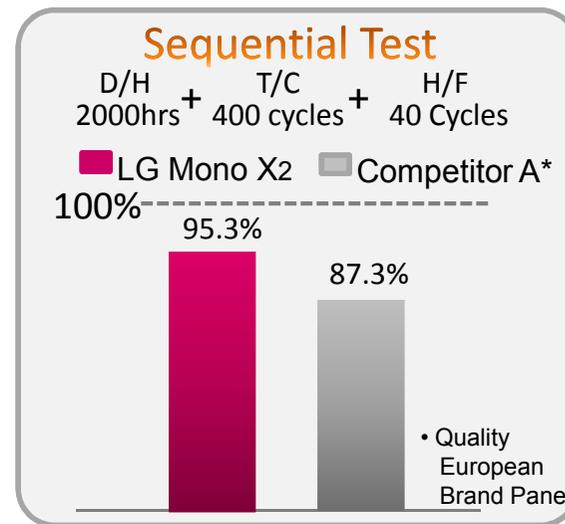


# LG Quality Control - Sequential Test

LG NeON<sup>2</sup>  
LG MonoX<sup>2</sup>



LG undertakes an extreme sequential Damp/Heat, Thermal/Cycle & Humidity/Freeze Test for its modules. This replicates extreme and prolonged weather conditions.



# LG Quality Control – other tests

LG NeON<sup>2</sup>  
LG MonoX<sup>2</sup>



## Tests





And in summary.....●



# Summary of key tests

LG NeON<sup>2</sup>  
LG MonoX<sup>2</sup>



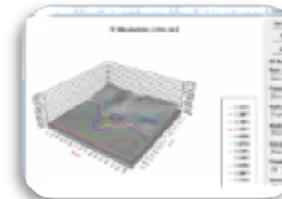
Tests are conducted in LG's UL/TUV/VDE/INTERTEK certified test labs



Temperature & Damp test for extreme weather cond.



Maximum Power Test



Wafer Resistance Test



Load Test 1 Dynamic Mechanical Load



Impact Fracture Test



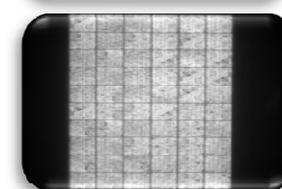
Wafer Impurity Test



Hail Impact Test



UV Test



Micro Crack (EL) Test



Salt Spray Test



Field Test



Load Test 2 Static Mechanical Load



Ammonia Resistance Test



Humidity Freeze Test



Backing Sheet Stress Test



# Low Hot Spot Risk due to two EL Tests

LG NeON<sup>2</sup>  
LG MonoX<sup>2</sup>



To find module defects during the production process, LG conducts EL ( Electroluminescence ) tests, prior and post lamination

	Soldering Check	Micro Crack Check
Image		
Details	Missing soldering spots between the ribbon and cell surface may cause hot spots	Micro-cracks in the cell can make the current mismatch, altering front Ag paste colour and material characteristics





Thank you for your time  
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