



LATEST TECHNOLOGY TRENDS

INTEGRATED WIRE MANAGEMENT

POSTER BY:
SAMUEL TRUTHSEEKER

TECSI
Solar

Scan QR code to
download this poster

Common Wire Management Issues

Dirt Inside Connectors



Wires Rubbing On Roof



Exceeding Temp Limits



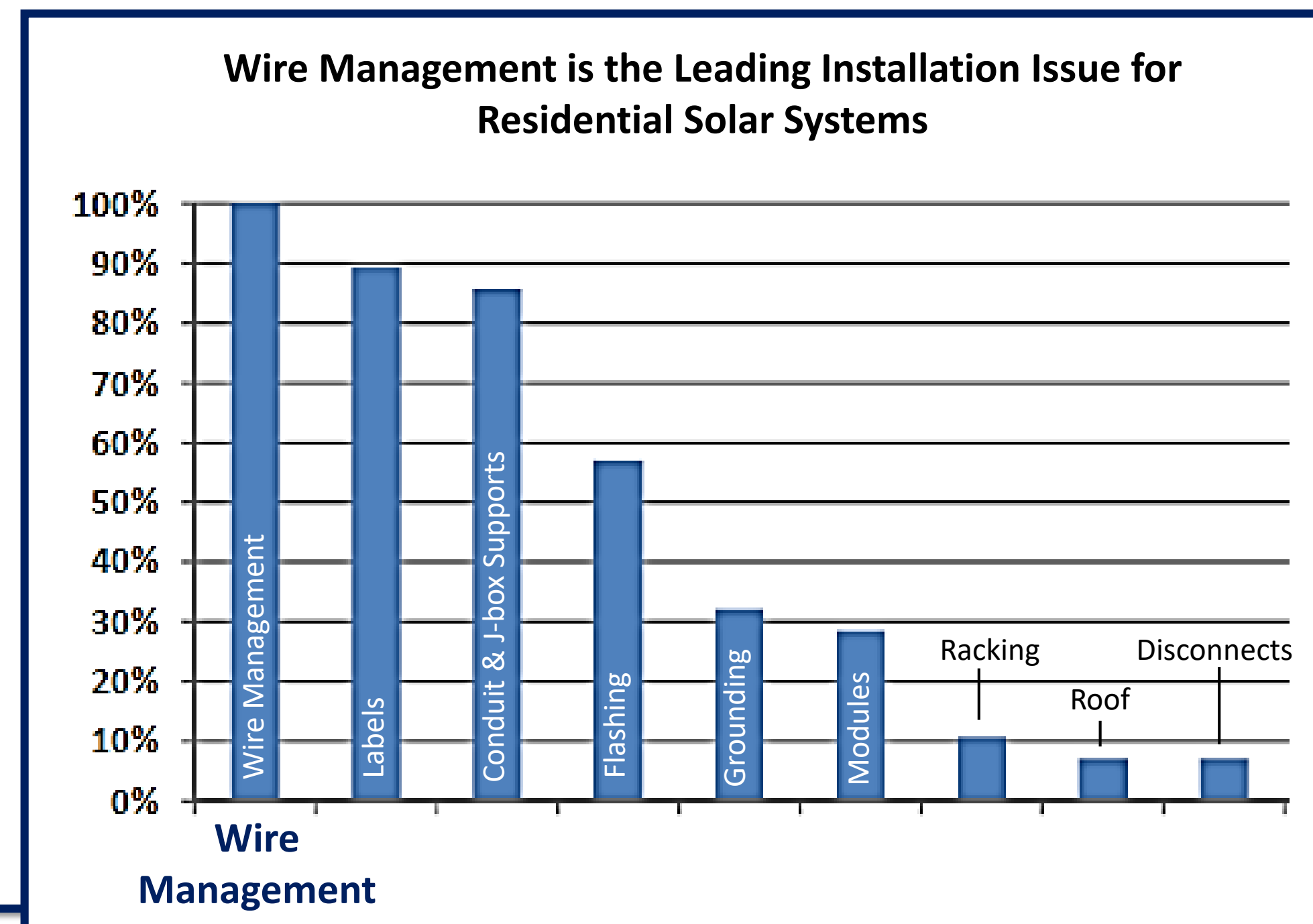
Pinched/Cut Wires



Messy & Unattractive



A study of residential solar systems showed that 100% of the systems audited had wire management issues. Conventional wire management devices were deployed on all systems. However, improper, delayed, and insufficient usage led to poor installation quality. Integrated wire management solutions have the opportunity to drastically reduce installation issues and eliminate electrical failures that could lead to shock hazards or system ground faults.



Wire Management Evolution

Fully integrated wire management (FIWM) products have the potential to simplify the supply chain, reduce installation time and increase AHJ approvals. Installers find that clip and tie costs are larger than anticipated for any given job. There are

Indoor/Outdoor Zip Ties



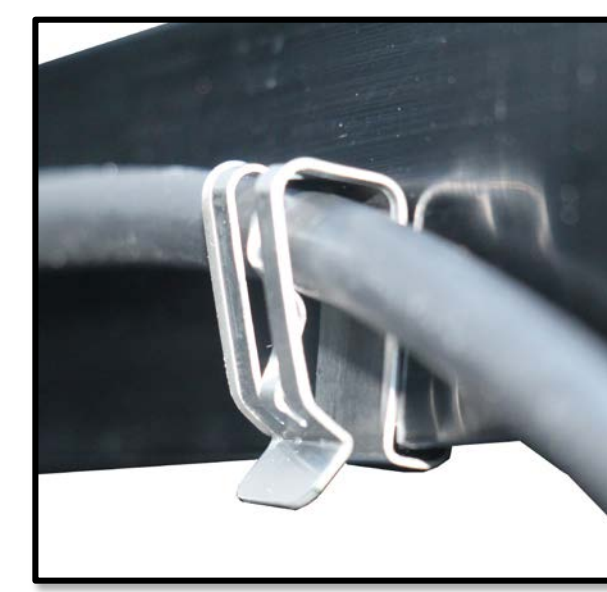
- Pros:**
- Readily Available
 - Non Conductive
- Cons:**
- 5 year life
 - Tool Required
 - Mounting Hole required
 - Multiple Parts Needed

Solar Ties



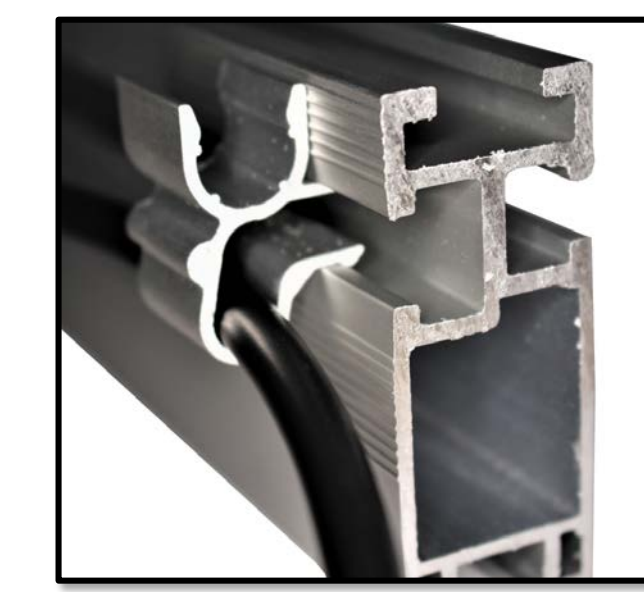
- Up to 25 Years
- Non Conductive
- Tool Required
- Mounting Hole required
- Multiple Parts Needed

Metal Clips



- Up to 25 Years
- No Tools Required
- No Mounting Hole Required
- Gloves Required
- Conductive & Sharp Edges
- Multiple Parts Needed

Racking with Features to Accept Clips



- Up to 25 Years
- No Tools Required
- No Mounting Hole Required
- Homerun Cables Only
- Conductive & Sharp Edges
- Multiple Parts Needed

Fully Integrated Wire Management

- Pros:**
- Lasts the Life of the System
 - No Tools Required
 - No Mounting Hole Required
 - Non Conductive
 - No Sharp Edges
 - No Additional Parts or SKUs
 - What you need where you need it
 - Reduced Install Costs

Racking Integrated



- Homerun Cables

Ground Mount Integrated



- Homerun Cables

J-box Integrated



- Securement for Shipping and Module Installation
- No Waste, No Tape.

Module Integrated



- Securement for Shipping and Module Installation
- No Waste, No Tape
- Homerun Cables
- Module Cables

Testing and Validation

How reliable is your wire management device? Testing any wire management design is critical and the tests that should be performed depend upon the wire management technology one is evaluating. For instance, polymeric wire management devices don't need to be tested by salt spray and metal devices don't need to be UV tested. Testing should evaluate a device's integrity as well as its long term impacts on the wire's insulation. This is accomplished by applying the load to the wire during testing. The pigtail of a standard 72 cell PV module weighs between 3.5-4 oz. So, testing should incorporate a minimum 2x safety factor, or 8 oz load. Following are some of the tests recommended for evaluating wire management devices.

UL 2703

HF10 – Humidity Freeze



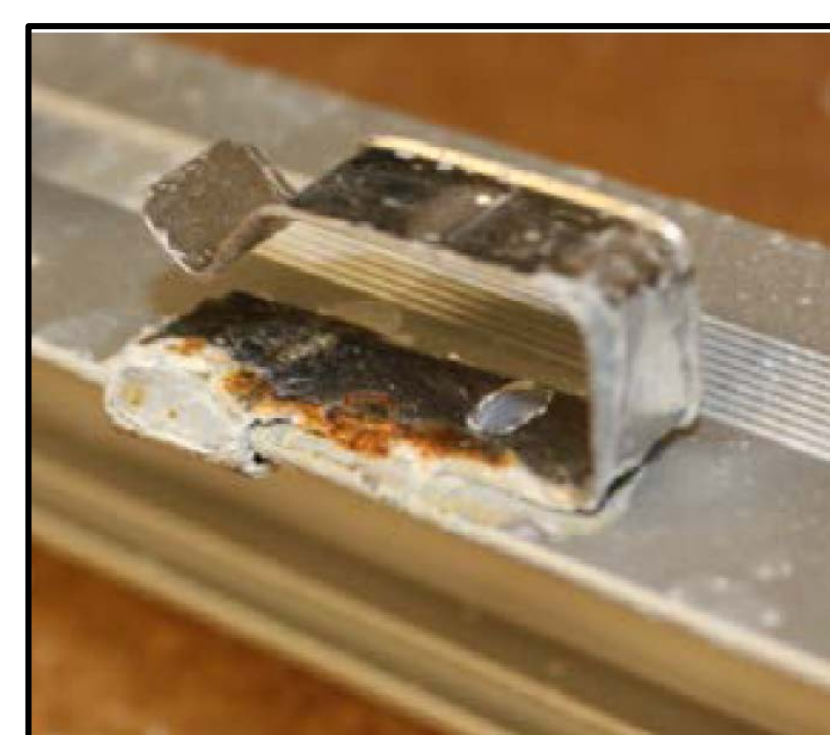
UL 1703

Wet Insulation Resistance



ASSTM B117

Salt Spray
Applicable to Metallic Devices



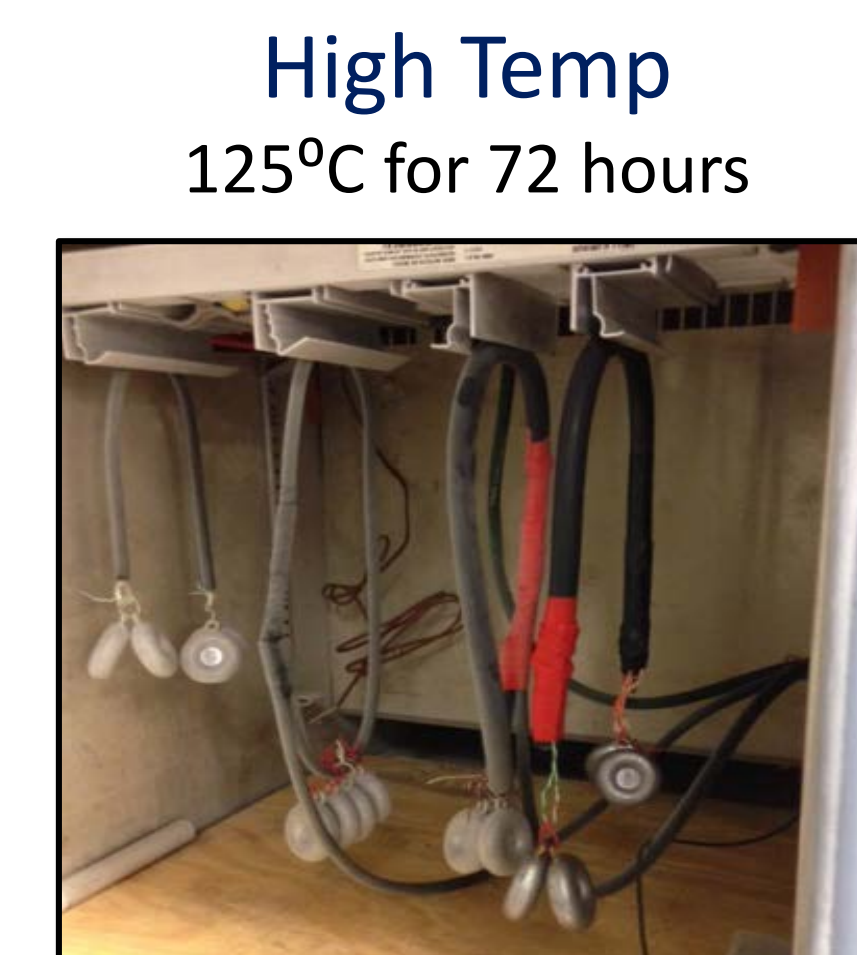
UL 1703

Leakage Current & Dielectric Voltage-Withstand



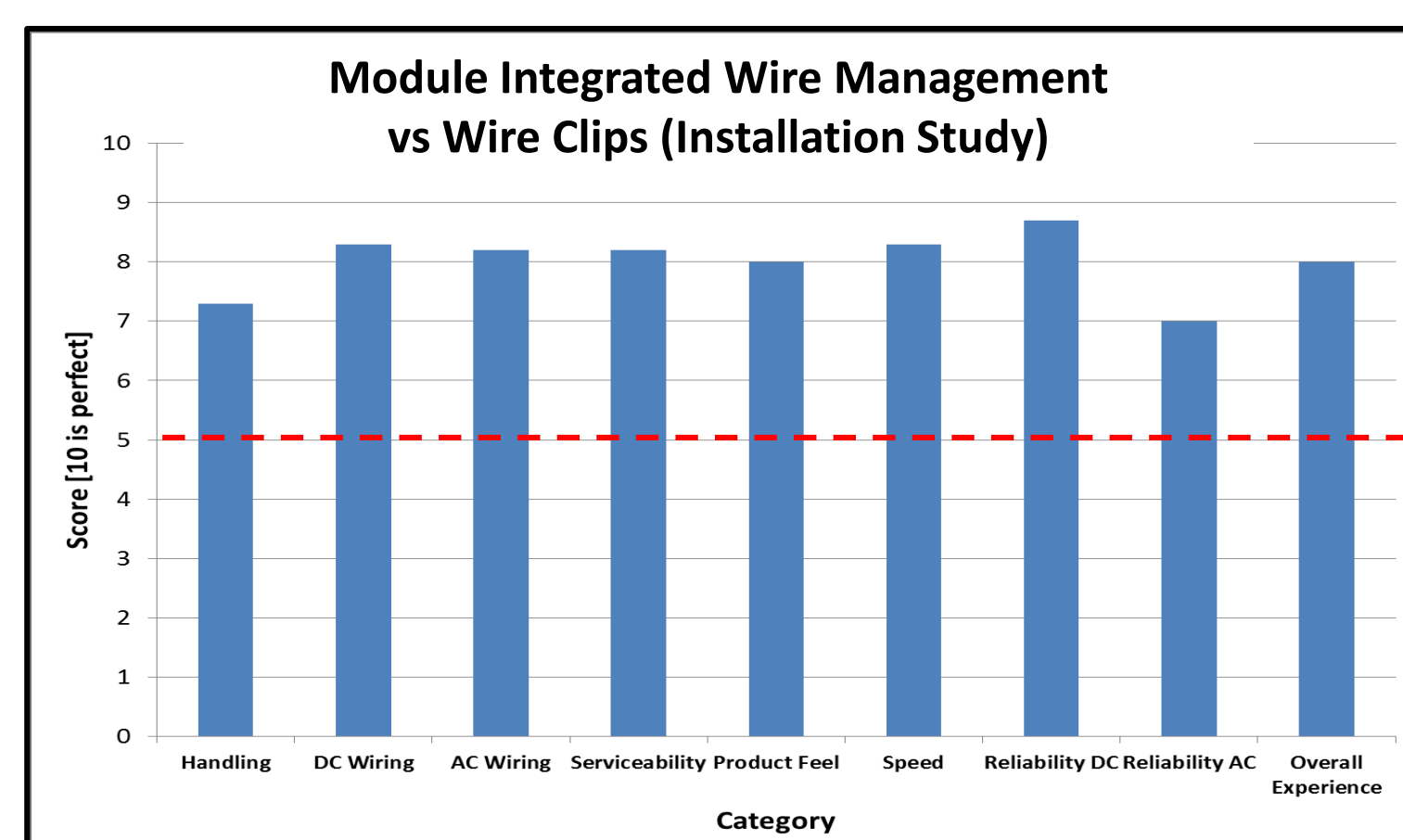
UL 2703

TC200 – Temperature Cycling
-40°C to +90°C



High Temp
125°C for 72 hours

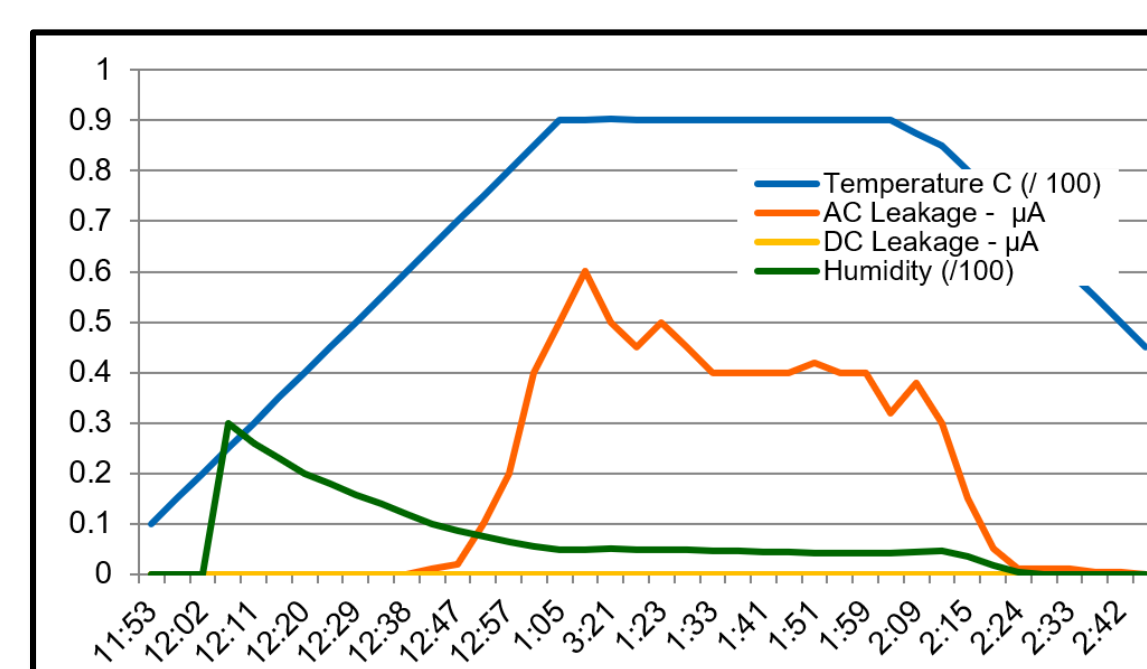
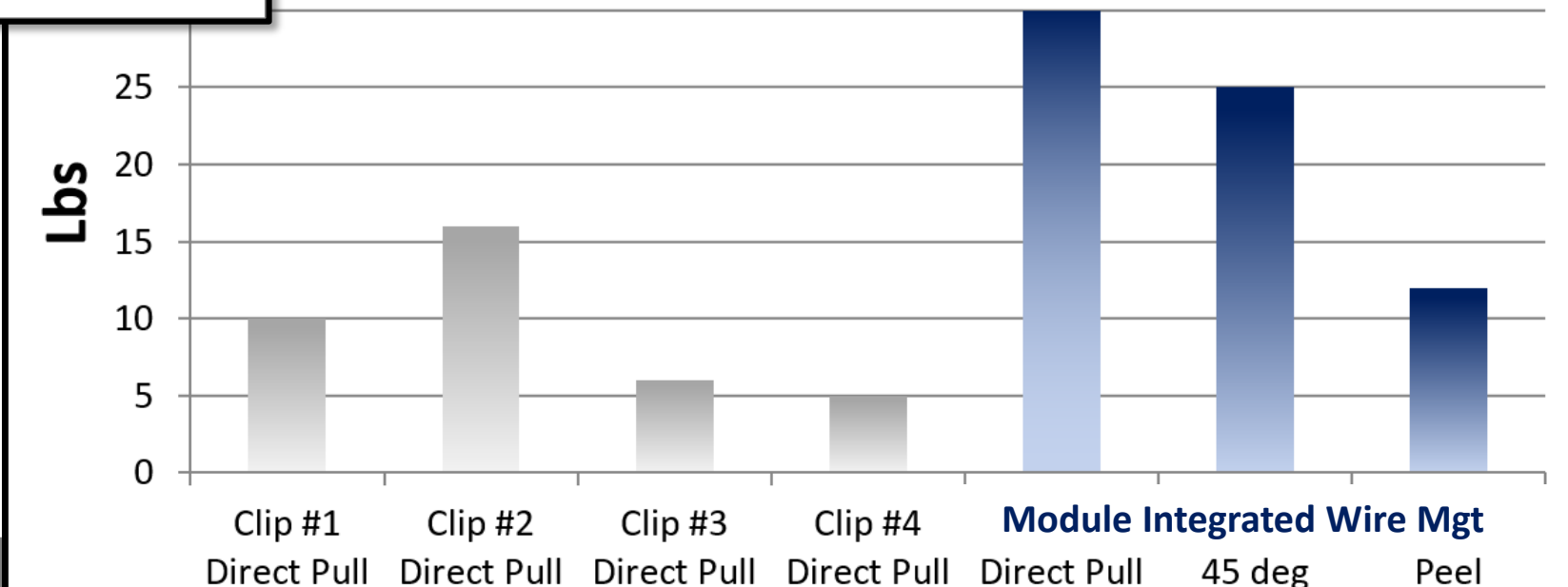
Realize the Promise of Fully Integrated Wire Mgt.



Ensure your product is the best through:

- Cross Functional Installation Studies
- Testing Comparisons
- Cost Analysis

Wire Pull Test

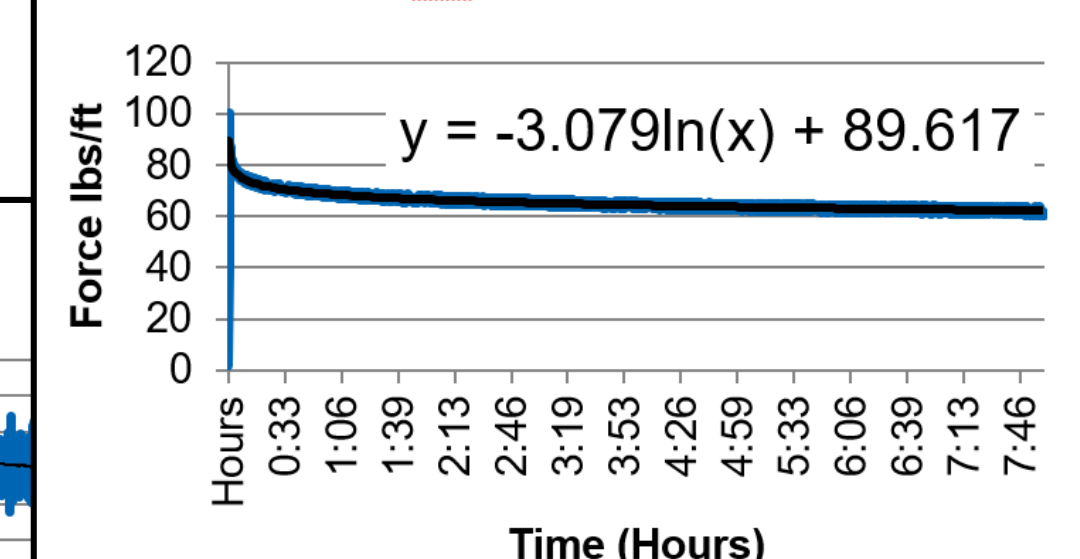


- Temperature cycling
- 2X system voltage + 1000V
- 50µA is max allowable leakage current. This product resulted in only 0.5µA
- Test both AC and DC current

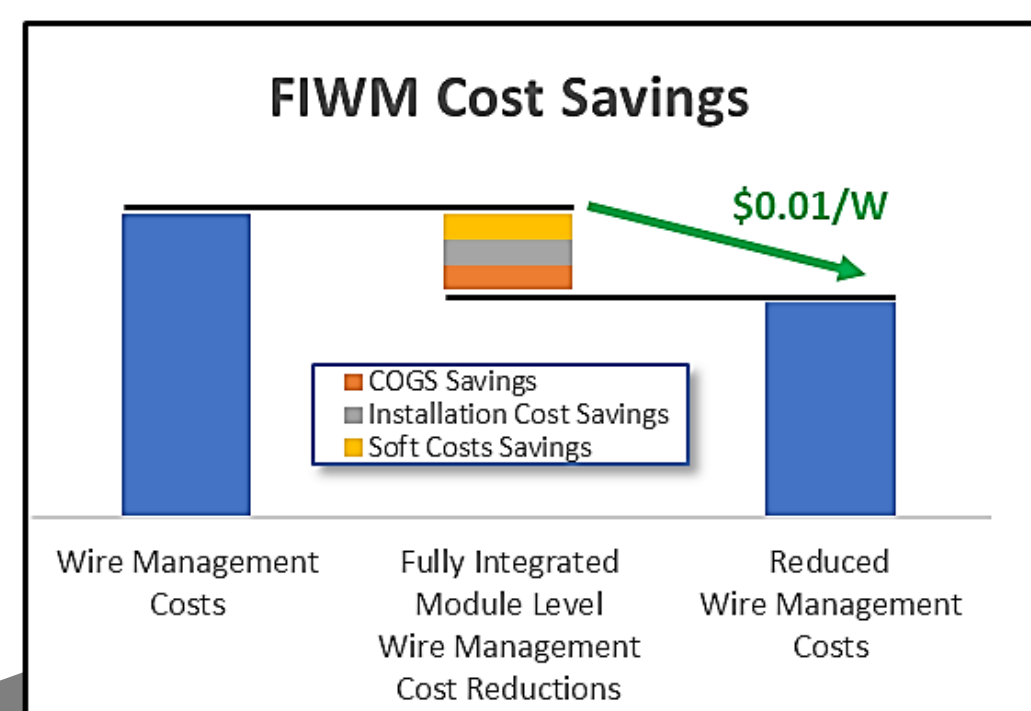
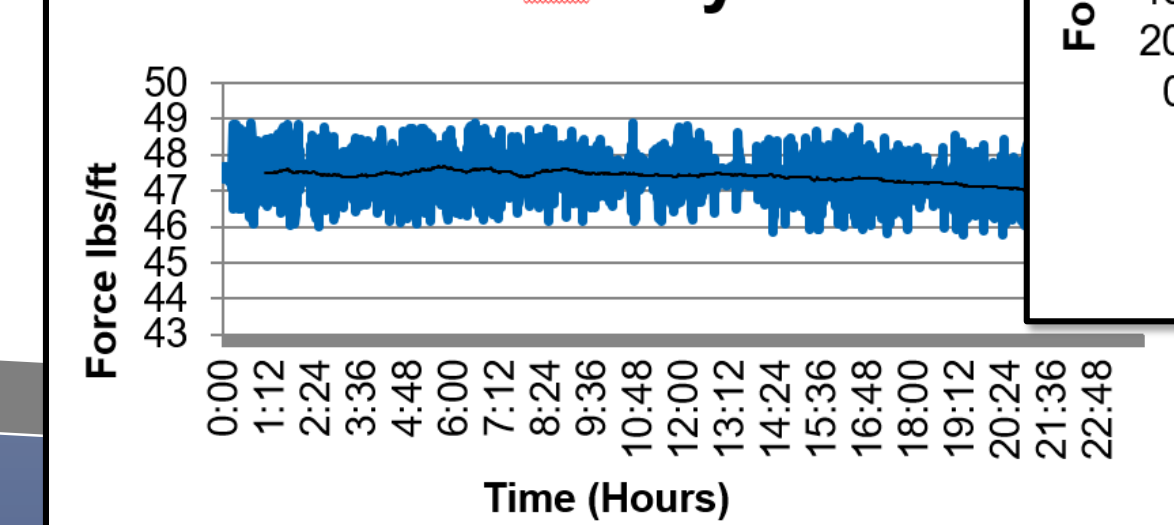
Wire Deformation & Elasticity Testing

~55% loss in clamping load

100 lb First 8 Hours



100 lb Day 14



TECSI Solar Inc. is an engineering services company for solar product manufacturers. Visit us at www.TECISolar.com to learn more.

Scan QR code to
download this poster

