IEC 61730-1:2004 Ed. 1.0 and IEC 61730-2:2004 Ed. 1.0
Photovoltaic module safety qualification –
Part 1: Requirements for construction and
Part 2: Requirements for testing

Retesting Guideline

Product or Process Modifications Requiring Limited CBTL Retesting to Maintain Safety Certification

This document sets forth a uniform approach to maintain the safety certification of products that have, or will, undergo modification from the articles originally certified. It should not be used as a guideline to certify new product submittals.

Changes in material selection, components and manufacturing process can impact the safety of the modified product. The recommended test sequences given below have been selected to identify adverse changes to the modified product.

Those products meeting the requirements of the relevant standard after retesting are considered to be compliant and will be issued an amended CB Conformity Assessment Certificate and an Amended Technical Report Form**.**

The number of samples to be included in the retesting program and the pass/fail criteria is to be taken from the standard originally used to certify the product (IEC 61730).

The document is organized by major modification headings and specific supporting examples. Following this is the recommended retesting sequence with parenthetical reference to the specific clauses of the relevant IEC standard.

For the modifications listed below, the Module Design Requirements and the Module Safety Tests in IEC 61730, shall be used as a guideline by the National Certification Body (NCB) and Certification Body Testing Laboratory (CBTL):

For the modifications listed below, the Module Design Requirements and the Module Safety Tests in IEC 61730, shall be used as a guideline by the assessor:

a) Change in cell technology

For modifications such as:

- metallization materials and/or process,
- anti-reflective coating material,
- type of diffusion process
- semiconductor layer materials,
- order of cell process if the change involves the metallization system,
- change of manufacturing site of the solar cells not under the same QA system,
- use of cells from a different manufacturer and
- major reduction in cell thickness (greater than 25%).

Repeat:

- Hot spot test (MST 22),
- Reverse current overload (MST 26), and
- Temperature test (MST 21).

b) Modification to encapsulation system

For modifications such as:

- different materials,
- different additives and
- different encapsulation process (e.g. curing rate).

Repeat:

- Damp heat (MST 53),
- Wet leakage current (MST 17),
- Dielectric Withstand (MST 16)
- Hot spot (MST 22) if material composition changes,
- Cut Susceptibility (MST 12), Impulse Voltage (MST 14) if material composition changes,
- Fire test (MST 23) if material composition changes, and Module Breakage test (MST 32) if material composition changes.
- Thermal cycling (MST 51, T50) and Humidity freeze (MST 52, 10HF)

c) Modification to superstrate

For modifications such as:

- different material,
- different thickness, reduced by more than 10%
- if glass, retest if there is a reduction in the heat strengthening process (for example retest if change is from tempered glass to heat strengthened or annealed), and
- different surface treatments, adhesives or primers if they are in direct contact with encapsulate material.
- If the change is from glass to non-glass or vice-versa, it should be considered a new product altogether.

Repeat:

- Damp heat (MST 53) (if non-glass)
- Wet leakage current test (MST 17) (if non-glass)
- Hot spot (MST 22) if material changes or thickness reductions
- Dielectric withstand test (MST 16) (if non-glass), Cut susceptibility test (MST 12) (if non-glass),
- Impulse voltage test (MST 14) (if non-glass or if glass thickness is reduced),
- Fire test (MST 23) if change in material, and
- Module breakage test (MST 32) if material or thickness changes.
- Mechanical load test (MST 34) (for glass thickness reduction or material changes)

d) Increase in module size

For increase by more than 20% of length or width:

— Module breakage test (MST 32)
— Mechanical load test (MST 34).

e) Modification to backsheet/substrate

For modifications such as:

— Different material
— Different thickness, and
— Different additives, surface treatments, adhesives and primers.

Repeat:

— Damp heat (MST 53) (if non-glass),
— Wet leakage current test (MST 17),
— Dielectric withstand test (MST 16) (if non-glass),Cut susceptibility test (MST 12) (if non-glass),
— Impulse voltage test (MST 14) (if non-glass),
— Fire test (MST 23) if change in material,
— Temperature test if change in material (MST 21), and
— Partial discharge test (MST 15) if non-glass and a change in material or thickness.

If there is a change from superstrate to substrate design or from substrate to superstrate design, the entire safety test sequence in IEC 6730 shall be conducted.

f) Modification to frame and/or mounting structure

For modifications such as:

— cross section of frame
— different framing material
— different mounting technique

Repeat:

— Damp heat (MST 53) if an adhesive system is used to mount the module and there is a surface contact reduction between laminate and frame,
— Dielectric withstand (MST16) if the area or location of contact to the laminate changes,
— Wet leakage current (MST 17) if the area or location of contact to the laminate changes,
— Ground continuity test (MST 13) (if change in method of assembly) and
— Fire test (MST 23) if the new frame material is flammable.

g) Modification to junction box/electrical termination

For modifications such as:

— different material,
— different design,
— different potting material, and
— different method of attachment.

Repeat:

— Damp heat (MST 53),
— Wet leakage current test (MST 17)
— Dielectric withstand test (MST 16),
— Accessibility test (MST 11),
— Conduit bending test (MST 33) if thickness reduction or polymer material changes,
— Terminal box knockout test (MST 44) if thickness reduction or polymer material changes.

h) Change in cell interconnect materials or technique

For modifications such as:

— Different interconnect material,
— different thickness of interconnect material
— different bonding technique
— different number of interconnects
— different number of solder bonds
— different solder material or flux.

Repeat:

— Hot spot for changes in bonding technique or solder material (MST 22)
— Reverse current test (MST 26).

i) Change in electrical circuit of an identical package

For modifications such as:

— Modifications to the interconnection circuitry (for example more cells per bypass diode or re-routing of output leads) and
— Reconfiguration of voltage (ie. 12 to 24)

Repeat:

— Hot spot (MST 22)
— Temperature Test (MST 21)
— Reverse current overload test (MST 26).

j) Higher power output (by 10% or more) in the identical package including size and using the identical cell process

Repeat:

— Hot spot (MST 22),
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— Reverse current overload test (MST 26).

k) Qualification of a frameless module after the design has received certification as a framed module

Repeat the following tests with the laminate mounted using the manufacturers mounting instructions.

— Damp heat (MST 53) (If frame is part of the package seal),
— Wet leakage current (MST 17),
— Dielectric withstand test (MST 16)
— Mechanical load test (MST 34)
— Module breakage test (MST 32).

Modifications that do not require re-testing

Provided that all structural components, materials used and processes (including cell process) remain the same, the following modifications shall not require re-testing:

— fewer cells in module;
— smaller cells in module, as long as each cell has the same number of interconnects and equivalent numbers of solder bonds per unit area.
— Up to 20% larger module area with the same number of cells.

