

# Aktuelt nyt om solcellestandarder

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# Overordnet indhold

- Strukturen i IEC TC 82 og CENELEC TC 82
- TC 82/WG 6
- Arbejdsprogram og færdige standarder for IEC TC 82
- Arbejdsprogram og færdige standarder for CENELEC TC 82
- Litium batterier
- BIPV
- Installationsstandarder

## Solcellestandardisering, Generelt



International Electrotechnical Commission

Her er arbejdet organiseret i tekniske komitéer (TC) efter emne.

**TC 82** Solar photovoltaic energy systems

TC 21 Secondary cells and batteries

TC 64 Electrical installations and protection against electric shock



European Committee for Electrotechnical Standardisation

**TC 82** Solar photovoltaic energy systems

TC 21X Secondary cells and batteries

TC 64 Electrical installations and protection against electric shock



## TC 82 organisation

47 medlemslande, 2 associerede medlemslande

### **Working Groups**

- WG 1 Glossary
- WG 2 Modules, non-concentrating
- WG 3 Systems
- WG 6 Balance-of-system components
- WG 7 Concentrator modules
- WG 8 Photovoltaic (PV) cells

### **Project Teams**

- PT 62994-1 Environmental Health and Safety (EH&S) Risk Assessment for the sustainability of PV module manufacturing - Part 1. General principles and definition of terms

### **Joint Working Groups**

- JWG 1 JCG TC 82/TC 88/TC 21/SC 21A
- JWG 82 TC21/TC82 - Secondary cells and batteries for Renewable Energy Storage Managed by TC 21
- JWG 32 Electrical safety of PV system installations Managed by TC 64



## TC 82 organisation

Alle CENELEC medlemslande er formelt medlemmer  
**Working Groups**

WG 01 Wafers, cells and modules

WG 02 BOS components and systems

# IEC TC82 Working Group 6

## Balance of System Components

**Scope:** Develop BOS standards in the general areas of performance, safety, environmental durability (reliability), quality assurance and quality assessment criteria.

### Ongoing projects

- IEC 63027 Ed. 1.0 (NP-CD) DC arc detection and interruption in photovoltaic power systems
- IEC 62920 Ed. 1.0 (CD) EMC requirements and test methods for grid connected power converters applying to photovoltaic power generating systems
- IEC 62109-3 Ed. 1.0 (2CD) Safety of power converters for use in photovoltaic power systems - Part 3: Particular requirements for electronic devices in combination with photovoltaic elements
- IEC 62093 Ed. 2.0 (RR/AMW-CD) Balance-of-system components for photovoltaic systems - Design qualification natural environment
- IEC 62894 Ed. 1.0 (Amd) Data sheet and name plate for photovoltaic inverters
- IEC 61683:Ed. 2.0 (PWI) Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
- IEC 62891 Ed. 1.0 (ADIS) Overall efficiency of grid connected photovoltaic inverters

# IEC TC82 Working Group 6

## Programme Overview – Existing and planned

### Inverters

#### Safety

- General and testing
- Earth-fault protection

#### Grid Related

- Anti-Islanding
- LVRT Testing

#### Performance

- Ratings
- Efficiency

#### Qualification & Reliability

#### Emissions

### Charge Controllers

#### Safety (coming)

#### Performance

#### Qualification

### Other

#### Arc-Fault detection

#### Through Liaisons

#### Combiner boxes

#### DC (PV) Switches

#### DC circuit breakers

#### Surge protection devices

#### Cables

#### Connector

# IEC TC 82 arbejdsprogram (1/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 60904-1 Ed. 3.0	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics	82/909/RR	2014-11	AMW - 2014-11	CCDV - 2015-10
IEC 60904-1-1 Ed. 1.0	Photovoltaic devices - Part 1-1: Measurement of current-voltage characteristics of multi-junction photovoltaic devices	82/937/CD	2013-09	ACDV - 2015-07	CCDV - 2015-11
IEC 60904-11 Ed. 1.0	Photovoltaic devices - Part 11: Measurement of initial light-induced degradation of crystalline silicon solar cells and photovoltaic modules	82/654/NP	2012-04	ANW - 2012-04	1CD - 2015-07
IEC 60904-3 Ed. 3.0	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	82/891/CDV	2014-09	RDIS - 2015-06	CDIS - 2015-09
IEC 60904-7 Ed. 4.0	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices	82/910/RR	2014-11	AMW - 2014-11	CCDV - 2015-10
IEC 60904-8-1 Ed. 1.0	Photovoltaic devices - Part 8-1: Measurement of spectral responsivity of multi-junction photovoltaic (PV) devices	82/938/CD	2013-09	ACDV - 2015-07	CCDV - 2015-11
IEC 60904-9 Ed. 3.0	Photovoltaic devices - Part 9: Solar simulator performance requirements	82/879/RR	2014-08	AMW - 2014-08	CCDV - 2015-02
IEC 60904-9-1 Ed. 1.0	Photovoltaic devices - Part 9-1: Collimated beam solar simulator performance requirements	82/972/NP	2015-08	ANW - 2015-08	1CD - 2015-12



# IEC TC 82 arbejdsprogram (2/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 61215-1 Ed. 1.0	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements	82/1046/FDIS	2008-08	CDIS - 2015-11	APUB - 2016-01
IEC 61215-1-1 Ed. 1.0	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules	82/1047/FDIS	2008-08	CDIS - 2015-11	APUB - 2016-01
IEC 61215-1-2 Ed. 1.0	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-2: Special requirements for testing of cadmium telluride (CdTe) photovoltaic (PV) modules	82/1010/CDV	2014-02	CCDV - 2015-10	ADIS - 2016-04
IEC 61215-1-3 Ed. 1.0	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-3: Special requirements for testing of amorphous silicon (a-Si) and microcrystalline silicon (micro c-Si) photovoltaic (PV) modules	82/1011/CDV	2014-02	CCDV - 2015-10	ADIS - 2016-04
IEC 61215-1-4 Ed. 1.0	Terrestrial photovoltaic (PV) modules Design qualification and type approval - Part 1-4: Special requirements for testing of copper indium gallium selenide (CIGS) and copper indium selenide (CIS) photovoltaic (PV) modules	82/1012/CDV	2014-02	CCDV - 2015-10	ADIS - 2016-04
IEC 61215-1-5 Ed. 1.0	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-5: Special requirements for testing of flexible (non-glass superstrate) photovoltaic (PV) modules	82/983/NP	2015-11	ANW - 2015-11	1CD - 2016-02
IEC 61215-2 Ed. 1.0	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures	82/1048/FDIS	2008-08	CDIS - 2015-11	APUB - 2016-01

# IEC TC 82 arbejdsprogram (3/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 61683 Ed. 2.0	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency			PWI - 2011-02	-
IEC 61724-1 Ed. 1.0	Photovoltaic system performance - Part 1: Monitoring	82/953/CD	2015-03	ACDV - 2015-07	CCDV - 2015-10
IEC 61724-2 Ed. 1.0	Photovoltaic system performance - Part 2: Capacity evaluation method	82/1043/CD	2015-07	1CD - 2015-10	A2CD - 2016-02
IEC 61724-3 Ed. 1.0	Photovoltaic system performance - Part 3: Energy evaluation method	82/955/CD	2014-06	ACDV - 2015-07	CCDV - 2015-10
IEC 61730-1 Ed. 2.0	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction	82/923/CDV	2012-05	ADIS - 2015-07	DEC - 2015-12
IEC 61730-2 Ed. 2.0	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing	82/924/CDV	2011-08	ADIS - 2015-07	DEC - 2015-12
IEC 61853-2 Ed. 1.0	Photovoltaic (PV) modules performance testing and energy rating - Part 2: Spectral response, incidence angle and module operating temperature measurements	82/774/CDV	2013-07	ADIS - 2013-12	DEC - 2014-11
IEC 61853-3 Ed. 1.0	Photovoltaic (PV) module performance testing and energy rating - Part 3: Energy Rating of PV Modules	82/911/NP	2015-02	ANW - 2015-02	1CD - 2015-06
IEC 61853-4 Ed. 1.0	Photovoltaic (PV) module performance testing and energy rating - Part 4: Standard reference climatic profiles	82/912/NP	2015-02	ANW - 2015-02	1CD - 2015-06

# IEC TC 82 arbejdsprogram (4/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 62093 Ed. 2.0	Balance-of-system components for photovoltaic systems - Design qualification natural environments	82/862/RR	2014-06	AMW - 2014-06	1CD - 2014-12
IEC 62108 Ed. 2.0	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval	82/906/CDV	2014-06	ADIS - 2015-09	DEC - 2015-09
IEC 62109-3 Ed. 1.0	Safety of power converters for use in photovoltaic power systems - Part 3: Particular requirements for electronic devices in combination with photovoltaic elements	82/849/CD	2012-05	ACDV - 2014-11	CCDV - 2015-06
IEC 62446-1 Ed. 1.0	Grid connected photovoltaic (PV) systems - Partie 1: Requirements for system documentation, commissioning tests and inspection	82/1036/FDIS	2012-08	CDIS - 2015-09	APUB - 2015-11
IEC 62446-2 Ed. 1.0	Grid connected photovoltaic (PV) systems - Part 2: Maintenance of PV systems	82/977/NP	2015-08	ANW - 2015-08	1CD - 2015-12
IEC 62548 Ed. 1.0	Photovoltaic (PV) arrays - Design requirements	82/1003/CDV	2014-07	CCDV - 2015-10	ADIS - 2016-04
IEC 62670-3 Ed. 1.0	Photovoltaic concentrators (CPV) - Performance testing - Part 3: Performance measurements and power rating	82/919/NP	2015-04	ANW - 2015-04	CCDV - 2015-12
IEC 62688 Ed. 1.0	Concentrator photovoltaic (CPV) module and assembly safety qualification	82/631/CD	2010-10	ACDV - 2012-03	CCDV - 2015-06
IEC 62787 Ed. 1.0	Concentrator photovoltaic (CPV) solar cells and cell-on-carrier (COC) assemblies - Reliability qualification	82/673/NP	2012-02	ANW - 2012-02	1CD - 2014-12

## IEC TC 82 arbejdsprogram (5/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 62788-1-2 Ed. 1.0	Measurement procedures for materials used in photovoltaic modules - Part 1-2: Encapsulants - Measurement of volume resistivity of photovoltaic encapsulation and backsheet materials	82/886/CDV	2012-02	ADIS - 2015-03	DEC - 2015-11
IEC 62788-1-4 Ed. 1.0	Measurement procedures for materials used in Photovoltaic Modules - Part 1-4: Encapsulants - Measurement of optical transmittance and calculation of the solar-weighted photon transmittance, yellowness index, and UV cut-off frequency	82/975/CDV	2012-02	CCDV - 2015-07	ADIS - 2016-01
IEC 62788-1-5 Ed. 1.0	Measurement procedures for materials used in photovoltaic modules - Part 1-5: Encapsulants - Measurement of change in linear dimensions of sheet encapsulation material resulting from applied thermal conditions	82/970/CDV	2012-07	CCDV - 2015-07	ADIS - 2016-01
IEC 62788-1-6 Ed. 1.0	Measurement procedures for materials used in photovoltaic modules - Part 1-6: Encapsulants - Test methods for determining the degree of cure in Ethylene-Vinyl Acetate encapsulation for photovoltaic modules	82/981/CDV	2011-12	CCDV - 2015-07	ADIS - 2016-01
IEC 62788-2 Ed. 1.0	Measurement procedures for materials used in photovoltaic modules - Part 2: Polymeric materials used for frontsheets and backsheets	82/1017/CD	2013-03	1CD - 2015-08	A2CD - 2015-12

# IEC TC 82 arbejdsprogram (6/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 62805-1 Ed. 1.0	Method for measuring photovoltaic (PV) glass - Part 1: Measurement of total haze and spectral distribution of haze	82/915/CD	2012-06	ACDV - 2015-03	CCDV - 2015-06
IEC 62805-2 Ed. 1.0	Method for measuring photovoltaic (PV) glass - Part 2: Measurement of transmittance and reflectance	82/916/CD	2012-06	ACDV - 2015-03	CCDV - 2015-06
IEC 62817 am1 Ed. 1.0	Amendment 1 to IEC 62817 Ed.1: Photovoltaic systems - Design qualification of solar trackers	82/1018/CDV	2015-08	CCDV - 2015-10	ADIS - 2016-04
IEC 62891 Ed. 1.0	Overall efficiency of grid connected photovoltaic inverters	82/866/CDV	2013-08	ADIS - 2015-01	DEC - 2015-03
IEC 62892-1 Ed. 1.0	Testing of PV modules to differentiate performance in multiple climates and applications - Part 1: Requirements for testing	82/929/CD	2013-08	ACDV - 2015-06	CCDV - 2015-10
IEC 62920 Ed. 1.0	EMC requirements and test methods for power conversion equipment applying to photovoltaic power generating systems	82/1038/CD	2014-02	1CD - 2015-10	A2CD - 2016-01
IEC 62925 Ed. 1.0	Thermal cycling test for CPV modules to differentiate increased thermal fatigue durability	82/985/CDV	2014-03	CCDV - 2015-08	ADIS - 2016-02
IEC 62938 Ed. 1.0	Non-uniform snow load testing for photovoltaic (PV) modules	82/930/CD	2014-05	ACDV - 2015-07	CCDV - 2015-09
IEC 62979 Ed. 1.0	Photovoltaic module bypass diode thermal runaway test	82/1025/CD	2015-01	1CD - 2015-09	A2CD - 2016-01

# IEC TC 82 arbejdsprogram (7/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC 62980 Ed. 1.0	Photovoltaic modules for building curtain wall applications	82/888/NP	2015-01	ANW - 2015-01	1CD - 2015-06
IEC 62994-1 Ed. 1.0	Environmental Health & Safety Risk Assessment for the sustainability of PV module manufacturing - Part 1: General principles and definition of terms	82/889/NP	2015-03	ANW - 2015-03	1CD - 2015-12
IEC 63027 Ed. 1.0	DC arc detection and interruption in photovoltaic power systems	82/973/NP	2015-08	ANW - 2015-08	1CD - 2015-12
IEC/TS 60904-12 Ed. 1.0	Photovoltaic devices - Part 12: Infrared thermography of photovoltaic modules	82/869/NP	2014-11	ANW - 2014-11	1CD - 2015-02
IEC/TS 60904-13 Ed. 1.0	Photovoltaic devices - Part 13: Electroluminescence of photovoltaic modules	82/901/NP	2015-01	ANW - 2015-01	1CD - 2015-06
IEC/TS 62257-7 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 7: Generators	82/871/RR	2014-07	AMW - 2014-07	CDTS - 2015-05
IEC/TS 62257-7-1 Ed. 3.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 7-1: Generators - Photovoltaic generators	82/871/RR	2014-07	AMW - 2014-07	CDTS - 2015-05
IEC/TS 62257-7-3 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 7-3: Generator set - Selection of generators sets for rural electrification systems	82/871/RR	2014-07	AMW - 2014-07	CDTS - 2015-05

# IEC TC 82 arbejdsprogram (8/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC/TS 62257-8-1 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 8-1: Selection of batteries and battery management systems for stand-alone electrification systems - Specific case of automotive flooded lead-acid batteries available in developing countries	82/871/RR	2014-07	AMW - 2014-07	CDTS - 2014-12
IEC/TS 62257-9-1 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-1: Micropower systems	82/1028/DTS	2014-07	CDTS - 2015-09	APUB - 2016-03
IEC/TS 62257-9-2 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-2: Microgrids	82/1029/DTS	2014-07	CDTS - 2015-09	APUB - 2016-03
IEC/TS 62257-9-3 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-3: Integrated system - User interface	82/1030/DTS	2014-07	CDTS - 2015-09	APUB - 2016-03
IEC/TS 62257-9-4 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-4: Integrated system - User installation	82/1031/DTS	2014-07	CDTS - 2015-09	APUB - 2016-03
IEC/TS 62257-9-5 Ed. 3.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-5: Integrated systems - Selection of stand-alone lighting kits for rural electrification	82/1051/DTS	2014-07	CDTS - 2015-11	APUB - 2016-05
IEC/TS 62257-9-6 Ed. 2.0	Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-6: Integrated system - Selection of Photovoltaic Individual Electrification Systems (PV-IES)	82/871/RR	2014-07	AMW - 2014-07	CDTS - 2015-06
IEC/TS 62446-3 Ed. 1.0	Grid connected photovoltaic (PV) systems - Part 3: Outdoor infrared thermography of photovoltaic modules and plants	82/956/NP	2015-09	ANW - 2015-09	1CD - 2015-12

# IEC TC 82 arbejdsprogram (9/9)

Project Reference	Title	Document Reference	Init. Date	Current Stage	Next Stage
IEC/TS 62738 Ed. 1.0	Design guidelines and recommendations for photovoltaic power plants	82/892/CD	2011-06	ACDV - 2015-01	CDTS - 2015-06
IEC/TS 62782 Ed. 1.0	Dynamic mechanical load testing for photovoltaic (PV) modules	82/971/DTS	2012-01	APUB - 2015-08	DEC - 2015-12
IEC/TS 62788-7-2 Ed. 1.0	Measurement procedures for materials used in photovoltaic modules - Part 7-2: Environmental exposures - Accelerated weathering tests of polymeric materials	82/1026/CD	2015-03	1CD - 2015-09	A2CD - 2016-01
IEC/TS 62915 Ed. 1.0	Photovoltaic (PV) Modules - Retesting for type approval, design and safety qualification	82/976/CD	2014-01	ACDV - 2015-08	CDTS - 2015-12
IEC/TS 62916 Ed. 1.0	Bypass diode electrostatic discharge susceptibility testing for photovoltaic modules	82/932/CD	2014-01	ACDV - 2015-07	CDTS - 2015-09
IEC/TS 62941 Ed. 1.0	Guideline for increased confidence in PV module design qualification and type approval	82/994/DTS	2014-06	APUB - 2015-11	DEC - 2016-02
IEC/TS 62989 Ed. 1.0	Primary Optics for Concentrator Photovoltaic Systems	82/904/NP	2015-02	ANW - 2015-02	1CD - 2015-12
IEC/TS 63019 Ed. 1.0	Information model for availability of photovoltaic (PV) power systems	82/944/NP	2015-07	ANW - 2015-07	1CD - 2015-10



# IEC TC 82 Standarder (1/4)

Reference	Title
<a href="#">IEC 60891:2009</a>	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics
<a href="#">IEC 60904-1:2006</a>	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics
<a href="#">IEC 60904-2:2015</a>	Photovoltaic devices - Part 2: Requirements for photovoltaic reference devices
<a href="#">IEC 60904-3:2008</a>	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data
<a href="#">IEC 60904-4:2009</a>	Photovoltaic devices - Part 4: Reference solar devices - Procedures for establishing calibration traceability
<a href="#">IEC 60904-5:2011</a>	Photovoltaic devices - Part 5: Determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method
<a href="#">IEC 60904-7:2008</a>	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices
<a href="#">IEC 60904-8:2014</a>	Photovoltaic devices - Part 8: Measurement of spectral responsivity of a photovoltaic (PV) device
<a href="#">IEC 60904-9:2007</a>	Photovoltaic devices - Part 9: Solar simulator performance requirements
<a href="#">IEC 60904-10:2009</a>	Photovoltaic devices - Part 10: Methods of linearity measurement
<a href="#">IEC 61215:2005</a>	Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval
<a href="#">IEC 61345:1998</a>	UV test for photovoltaic (PV) modules
<a href="#">IEC 61646:2008</a>	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval
<a href="#">IEC 61683:1999</a>	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
<a href="#">IEC 61701:2011</a>	Salt mist corrosion testing of photovoltaic (PV) modules
<a href="#">IEC 61724:1998</a>	Photovoltaic system performance monitoring - Guidelines for measurement, data exchange and analysis
<a href="#">IEC 61725:1997</a>	Analytical expression for daily solar profiles
<a href="#">IEC 61727:2004</a>	Photovoltaic (PV) systems - Characteristics of the utility interface
<a href="#">IEC 61730-1:2004+AMD1:2011+AMD2:2013 CSV</a>	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
<a href="#">IEC 61730-1:2004</a>	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
<a href="#">IEC 61730-1:2004/AMD1:2011</a>	Amendment 1 - Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction

# IEC TC 82 Standarder (2/4)

Reference	Title
<a href="#">IEC 61730-1:2004/AMD2:2013</a>	Amendment 2 - Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
<a href="#">IEC 61730-2:2004+AMD1:2011</a> <a href="#">CSV</a>	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
<a href="#">IEC 61730-2:2004</a>	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
<a href="#">IEC 61730-2:2004/AMD1:2011</a>	Amendment 1 - Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
<a href="#">IEC 61829:2015</a>	Photovoltaic (PV) array - On-site measurement of current-voltage characteristics
<a href="#">IEC TS 61836:2007</a>	Solar photovoltaic energy systems - Terms, definitions and symbols
<a href="#">IEC 61853-1:2011</a>	Photovoltaic (PV) module performance testing and energy rating - Part 1: Irradiance and temperature performance measurements and power rating
<a href="#">IEC 62093:2005</a>	Balance-of-system components for photovoltaic systems - Design qualification natural environments
<a href="#">IEC 62108:2007</a>	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval
<a href="#">IEC 62109-1:2010</a>	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
<a href="#">IEC 62109-2:2011</a>	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
<a href="#">IEC PAS 62111:1999</a>	Specifications for the use of renewable energies in rural decentralised electrification
<a href="#">IEC 62116:2014</a>	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
<a href="#">IEC 62124:2004</a>	Photovoltaic (PV) stand alone systems - Design verification
<a href="#">IEC 62253:2011</a>	Photovoltaic pumping systems - Design qualification and performance measurements
<a href="#">IEC TS 62257-1:2015</a>	Recommendations for renewable energy and hybrid systems for rural electrification - Part 1: General introduction to IEC 62257 series and rural electrification
<a href="#">IEC TS 62257-2:2004</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 2: From requirements to a range of electrification systems
<a href="#">IEC TS 62257-3:2004</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 3: Project development and management

## IEC TC 82 Standarder (3/4)

Reference	Title
<a href="#">IEC TS 62257-4:2005</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 4: System selection and design
<a href="#">IEC TS 62257-5:2005</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 5: Protection against electrical hazards
<a href="#">IEC TS 62257-6:2005</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 6: Acceptance, operation, maintenance and replacement
<a href="#">IEC TS 62257-7:2008</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 7: Generators
<a href="#">IEC TS 62257-7-1:2010</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 7-1: Generators - Photovoltaic generators
<a href="#">IEC TS 62257-7-3:2008</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 7-3: Generator set - Selection of generator sets for rural electrification systems
<a href="#">IEC TS 62257-8-1:2007</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 8-1: Selection of batteries and battery management systems for stand-alone electrification systems - Specific case of automotive flooded lead-acid batteries available in developing countries
<a href="#">IEC TS 62257-9-1:2008</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 9-1: Micropower systems
<a href="#">IEC TS 62257-9-2:2006</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 9-2: Microgrids
<a href="#">IEC TS 62257-9-3:2006</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 9-3: Integrated system - User interface
<a href="#">IEC TS 62257-9-4:2006</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 9-4: Integrated system - User installation
<a href="#">IEC TS 62257-9-5:2013</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 9-5: Integrated system - Selection of stand-alone lighting kits for rural electrification
<a href="#">IEC TS 62257-9-6:2008</a>	Recommendations for small renewable energy and hybrid systems for rural electrification - Part 9-6: Integrated system - Selection of Photovoltaic Individual Electrification Systems (PV-IES)
<a href="#">IEC TS 62257-12-1:2015</a>	Recommendations for renewable energy and hybrid systems for rural electrification - Part 12-1: Selection of lamps and lighting appliances for off-grid electricity systems

# IEC TC 82 Standarder (4/4)

Reference	Title
<a href="#">IEC 62446:2009</a>	Grid connected photovoltaic systems - Minimum requirements for system documentation, commissioning tests and inspection
<a href="#">IEC 62509:2010</a>	Battery charge controllers for photovoltaic systems - Performance and functioning
<a href="#">IEC TS 62548:2013</a>	Photovoltaic (PV) arrays - Design requirements
<a href="#">IEC 62670-1:2013</a>	Photovoltaic concentrators (CPV) - Performance testing - Part 1: Standard conditions
<a href="#">IEC 62670-2:2015</a>	Photovoltaic concentrators (CPV) - Performance testing - Part 2: Energy measurement
<a href="#">IEC 62716:2013</a>	Photovoltaic (PV) modules - Ammonia corrosion testing
<a href="#">IEC 62716:2013/COR1:2014</a>	Corrigendum 1 - Photovoltaic (PV) modules - Ammonia corrosion testing
<a href="#">IEC TS 62727:2012</a>	Photovoltaic systems - Specification for solar trackers
<a href="#">IEC 62759-1:2015</a>	Photovoltaic (PV) modules - Transportation testing - Part 1: Transportation and shipping of module package units
<a href="#">IEC TS 62789:2014</a>	Photovoltaic concentrator cell documentation
<a href="#">IEC 62790:2014</a>	Junction boxes for photovoltaic modules - Safety requirements and tests
<a href="#">IEC TS 62804-1:2015</a>	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation - Part 1: Crystalline silicon
<a href="#">IEC 62817:2014</a>	Photovoltaic systems - Design qualification of solar trackers
<a href="#">IEC 62852:2014</a>	Connectors for DC-application in photovoltaic systems - Safety requirements and tests
<a href="#">IEC 62894:2014</a>	Photovoltaic inverters - Data sheet and name plate
<a href="#">IEC TS 62910:2015</a>	Utility-interconnected photovoltaic inverters - Test procedure for low voltage ride-through measurements

# CENELEC TC 82 Arbejdsprogram (1/2)

Project	Title	Current Code	Current Stage	Voting Date
prEN 50380(25384)	Marking and documentation requirements for Photovoltaic Modules	30.99.0979	2015-11-09	2016-08-21
EN 50583-1:2015(23051)	Photovoltaics in buildings - Part 1: BIPV modules	50.60.0000	2015-09-04	2015-04-15
EN 50583-2:2015(25383)	Photovoltaics in buildings - Part 2: BIPV systems	60.55.0000	2015-10-12	2015-04-15
prEN 50XXX(25385)	External fire exposure to roofs in combination with photovoltaic (PV) arrays – Test method(s)	10.99.0000	2014-05-06	2016-08-21
FprEN 60904-3:2014(59380)	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	50.60.0000	2015-03-06	2015-11-06
FprEN 61215-1-1:2015(25372)	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules	50.20.0000	2015-11-27	2015-03-25
FprEN 61215-1-2:2015(61202)	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-2: Special requirements for testing of cadmium telluride (CdTe) photovoltaic (PV) modules	50.20.0000	2015-10-16	2016-09-22
FprEN 61215-1-3:2015(61203)	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-3: Special requirements for testing of amorphous silicon (a-Si) and microcrystalline silicon (micro c-Si) photovoltaic (PV) modules	50.20.0000	2015-10-16	2016-09-22
FprEN 61215-1-4:2015(61204)	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-4: Special requirements for testing of copper indium gallium selenide (CIGS) and copper indium selenide (CIS) photovoltaic (PV) modules	50.20.0000	2015-10-16	2016-09-22
FprEN 61215-1:2015(25371)	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Requirements for testing	50.20.0000	2015-11-27	2015-03-25
FprEN 61215-2:2015(25373)	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures	50.20.0000	2015-11-27	2015-03-25
EN 61730-1:2007/prA12(60581)	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction	10.99.0000	2015-07-28	

# CENELEC TC 82 Arbejdsprogram (2/2)

Project	Title	Current Code	Current Stage	Voting Date
FprEN 61730-1:2015(24310)	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction	50.60.0000	2015-06-26	2016-02-26
FprEN 61730-2:2015(60231)	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing	50.60.0000	2015-06-26	2016-02-26
EN 61829:2015(24024)	Photovoltaic (PV) array - On-site measurement of current voltage characteristics	60.55.0000	2015-11-26	2013-03-13
FprEN 61853-2:2013(23038)	Photovoltaic (PV) module performance testing and energy rating - Part 2: Spectral response, incidence angle and module operating temperature measurements	50.60.0000	2013-10-11	2011-08-17
FprEN 62108:2015(59569)	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval	50.60.0000	2015-04-17	2015-12-17
FprEN 62446-1:2015(25293)	Grid connected PV systems - Part 1: Requirements for system documentation, commissioning tests and inspection	50.60.0000	2015-11-27	2015-01-23
prEN 62670-3(61524)	Photovoltaic concentrators (CPV) - Performance testing - Part 3: Performance measurements and power rating	10.99.0000	2015-10-10	2017-12-27
FprEN 62788-1-2:2014(59338)	Measurement procedures for materials used in photovoltaic modules - Part 1-2: Encapsulants - Measurement of volume resistivity of photovoltaic encapsulation and backsheet materials	50.60.0000	2015-02-20	2015-10-20
FprEN 62788-1-4:2015(60598)	Measurement procedures for materials used in photovoltaic modules - Part 1-4: Encapsulants - Measurement of optical transmittance and calculation of the solar-weighted photon transmittance, yellowness index, and UV cut-off frequency	50.60.0000	2015-10-16	2016-06-16
FprEN 62788-1-5:2015(60551)	Measurement procedures for materials used in photovoltaic modules - Part 1-5: Encapsulants - Measurement of change in linear dimensions of sheet encapsulation material resulting from applied thermal conditions	50.60.0000	2015-10-09	2016-06-09
FprEN 62788-1-6:2015(60773)	Measurement procedures for materials used in photovoltaic modules - Part 1-6: Encapsulants - Test methods for determining the degree of cure in Ethylene-Vinyl Acetate encapsulation for photovoltaic modules	50.60.0000	2015-11-06	2016-07-06
EN 62817:2015/FprA1:2015(61218)	Photovoltaic systems - Design qualification of solar trackers	50.20.0000	2015-10-23	2016-09-29
FprEN 62925:2015(60901)	Thermal cycling test for CPV modules to differentiate increased thermal fatigue durability	50.60.0000	2015-11-27	2016-07-27

# CENELEC TC 82 Standarder (1/3)

Reference	Title
EN 62446:2009	Grid connected photovoltaic systems – Minimum requirements for system documentation, commissioning tests and inspection
EN 61345:1998	UV test for photovoltaic (PV) modules
EN 62124:2005	Photovoltaic (PV) stand-alone systems - Design verification
EN 50521:2008	Connectors for photovoltaic systems - Safety requirements and tests
EN 60904-3:2008	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data
EN 61727:1995	Photovoltaic (PV) systems - Characteristics of the utility interface
EN 50548:2011/A2:2014	Junction boxes for photovoltaic modules
EN 61730-1:2007/A1:2012	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
EN 60904-1:2006	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics
EN 62109-2:2011	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
EN 50513:2009	Solar wafers - Data sheet and product information for crystalline silicon wafers for solar cell manufacturing
EN 61724:1998	Photovoltaic system performance monitoring - Guidelines for measurement, data exchange and analysis
EN 60904-8:2014	Photovoltaic devices - Part 8: Measurement of spectral responsivity of a photovoltaic (PV) device
EN 61730-2:2007	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
EN 50521:2008/A1:2012	Connectors for photovoltaic systems - Safety requirements and tests
EN 50548:2011	Junction boxes for photovoltaic modules
EN 60904-8:1998	Photovoltaic devices - Part 8: Measurement of spectral response of a photovoltaic (PV) device
EN 60904-2:2007	Photovoltaic devices - Part 2: Requirements for reference solar devices
EN 61215:2005	Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval

## CENELEC TC 82 Standarder (2/3)

Reference	Title
EN 61730-1:2007	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
EN 62817:2015	Photovoltaic systems - Design qualification of solar trackers
EN 50461:2006	Solar cells - Datasheet information and product data for crystalline silicon solar cells
EN 61725:1997	Analytical expression for daily solar profiles
EN 62716:2013	Photovoltaic (PV) modules - Ammonia corrosion testing
EN 60904-4:2009	Photovoltaic devices - Part 4: Reference solar devices - Procedures for establishing calibration traceability
EN 62790:2015	Junction boxes for photovoltaic modules - Safety requirements and tests
EN 62093:2005	Balance-of-system components for photovoltaic systems - Design qualification natural environments
EN 50530:2010	Overall efficiency of grid connected photovoltaic inverters
EN 61701:2012	Salt mist corrosion testing of photovoltaic (PV) modules
EN 61853-1:2011	Photovoltaic (PV) module performance testing and energy rating - Part 1: Irradiance and temperature performance measurements and power rating
CLC/TS 61836:2009	Solar photovoltaic energy systems - Terms, definitions and symbols
EN 60904-10:2010	Photovoltaic devices - Part 10: Methods of linearity measurement
EN 61730-2:2007/A1:2012	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
EN 62670-1:2014	Photovoltaic concentrators (CPV) - Performance testing - Part 1: Standard conditions
EN 61683:2000	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
EN 62509:2011	Battery charge controllers for photovoltaic systems - Performance and functioning
EN 62108:2008	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval
EN 61829:1998	Crystalline silicon photovoltaic (PV) array - On-site measurement of I-V characteristics



# CENELEC TC 82 Standarder (3/3)

Reference	Title
EN 60904-9:2007	Photovoltaic devices - Part 9: Solar simulator performance requirements
EN 61646:2008	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval
EN 62116:2011	Test procedure of islanding prevention measures for utility-interconnected photovoltaic inverters
EN 60904-7:2009	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices
EN 62670-2:2015	Photovoltaic concentrators (CPV) - Performance testing - Part 2: Energy measurement
EN 62116:2014	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
EN 61194:1995	Characteristic parameters of stand-alone photovoltaic (PV) systems
EN 60904-2:2015	Photovoltaic devices - Part 2: Requirements for photovoltaic reference devices
EN 50524:2009	Data sheet and name plate for photovoltaic inverters
EN 50380:2003	Datasheet and nameplate information for photovoltaic modules
EN 62759-1:2015	Photovoltaic (PV) modules - Transportation testing - Part 1: Transportation and shipping of module package units
EN 62253:2011	Photovoltaic pumping systems - Design qualification and performance measurements
EN 50530:2010/A1:2013	Overall efficiency of grid connected photovoltaic inverters
EN 62109-1:2010	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
EN 60904-5:2011	Photovoltaic devices - Part 5: Determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method
EN 50548:2011/A1:2013	Junction boxes for photovoltaic modules
EN 61730-1:2007/A11:2014	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
EN 61730-1:2007/A2:2013	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
EN 60891:2010	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics
EN 62852:2015	Connectors for DC-application in photovoltaic systems - Safety requirements and tests
EN 61702:1999	Rating of direct coupled photovoltaic (PV) pumping systems
EN 62716:2013/AC:2014	Photovoltaic (PV) modules - Ammonia corrosion testing

# TC 21 Secondary cells and batteries

## Solcellebatterier

### **Subcommittees**

SC 21A Secondary cells and batteries containing alkaline or other non-acid electrolytes

### **Working Groups**

WG 8 Safety requirements for secondary batteries and battery installations

WG 10 Safety standard on lithium batteries and battery installations used for stationary applications

### **Joint Working Groups**

JWG 82 TC21/TC82 - Secondary cells and batteries for Renewable Energy Storage linked to TC 82

# Litiumbatterier - standarder

IEC 62485-5 Ed. 1.0 **Vedtaget nyt forslag – 1. draft 2017 – Std 2018**  
Safety requirements for secondary batteries and battery installations  
- Part - 5 : Lithium-ion batteries for stationary applications

IEC 62619 Ed. 1.0 **næsten færdig standard 2016**  
Secondary cells and batteries containing alkaline or other non-acid  
electrolytes - Safety requirements for large format secondary lithium  
cells and batteries for use in industrial applications

IEC 62620:2014 Edition 1.0 (2014-11-25)  
Secondary cells and batteries containing alkaline or other non-acid  
electrolytes - Secondary lithium cells and batteries for use in  
industrial applications

# Stationære litiumbatterier

## VDE-AR-E 2510-50

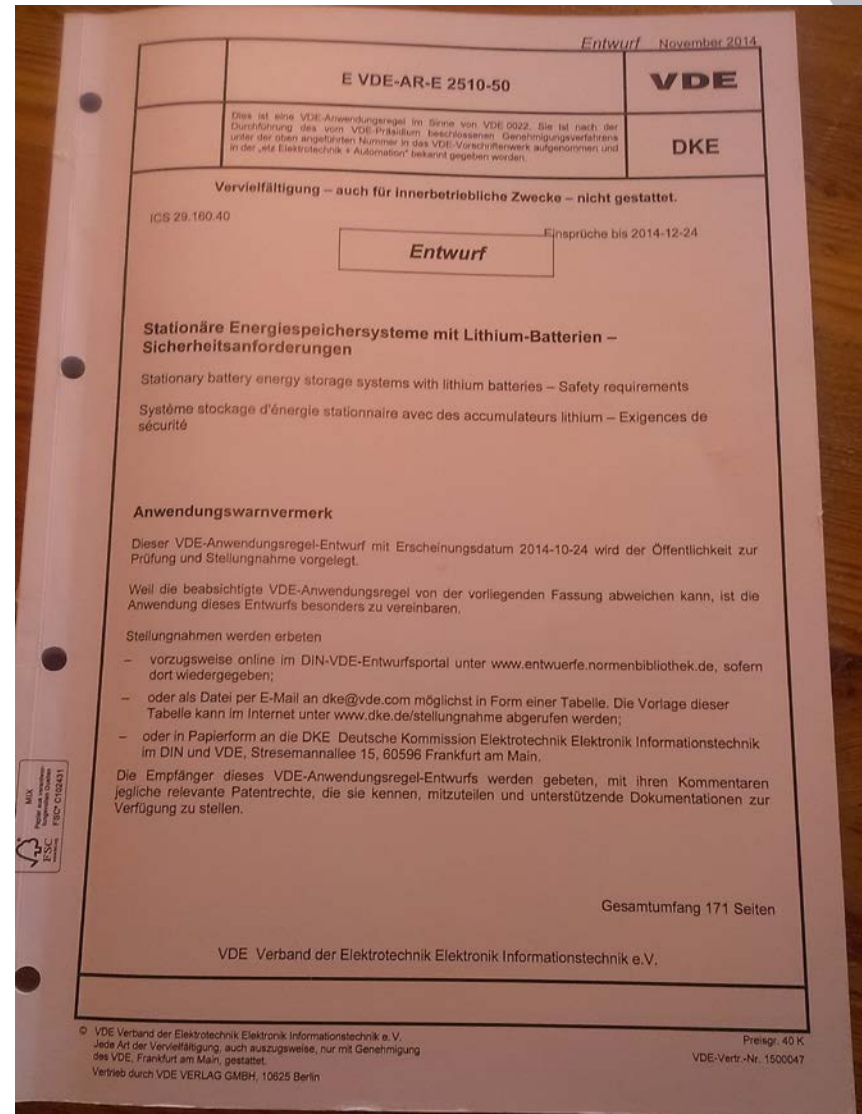
Anwendungsregel: 2014-11

\* German Language Version \*

Stationary battery energy storage systems with lithium batteries

Safety requirements

Specification of general safety requirements for stationary energy storage systems with lithium batteries. Also provides the basis for the certification of components of a complete system, e.g. single batteries.



# Installationsbestemmelserne for litiumbatterier

Installationen dækkes (formodentlig) af den kommende IEC  
60364-7-712

# BIPV

- EN 50583-1 Photovoltaics in buildings - Part 1: BIPV modules
- EN 50583-2 Photovoltaics in buildings - Part 2: BIPV systems

Begge standarder er teknisk færdige, men er ikke udgivet endnu. Forventes udgivet promo 2016.

Opbygningen er sket med fokus på CPR, dvs med mange skemaer med referencer til andre standarder.

Opbygningen afspejler den store forskel der er mellem dem der indeholder glas og dem der ikke gør.

# PV installationsbestemmelser





# Installationsbestemmelser for PV

I dag gælder Stærkstrømsbekendtgørelsens Afsnit 6 – i særdeleshed kapitel 712 Solcellesystemer

Bestemmelserne er en oversættelse af HD 60364-7-712:2005 (=IEC 60364-7-712) Low-voltage electrical installations - Part 7-712: Requirements for special installations or locations - Photovoltaic (PV) systems

Der er vedtaget en **ny HD 60364-7-712:2015**, der stadig er ved at blive bearbejdet til trykning. I Danmark får den gyldighed fra **1. juli 2016**, hvor en ny bekendtgørelse om elektriske installationer træder i kraft. Der vil dog være en overgangsordning frem til **1. juli 2018** hvor de nuværende bestemmelser kan bruges.

Fremadrettet skal man bruge standarder direkte. DS vil oversætte installationsstandarderne

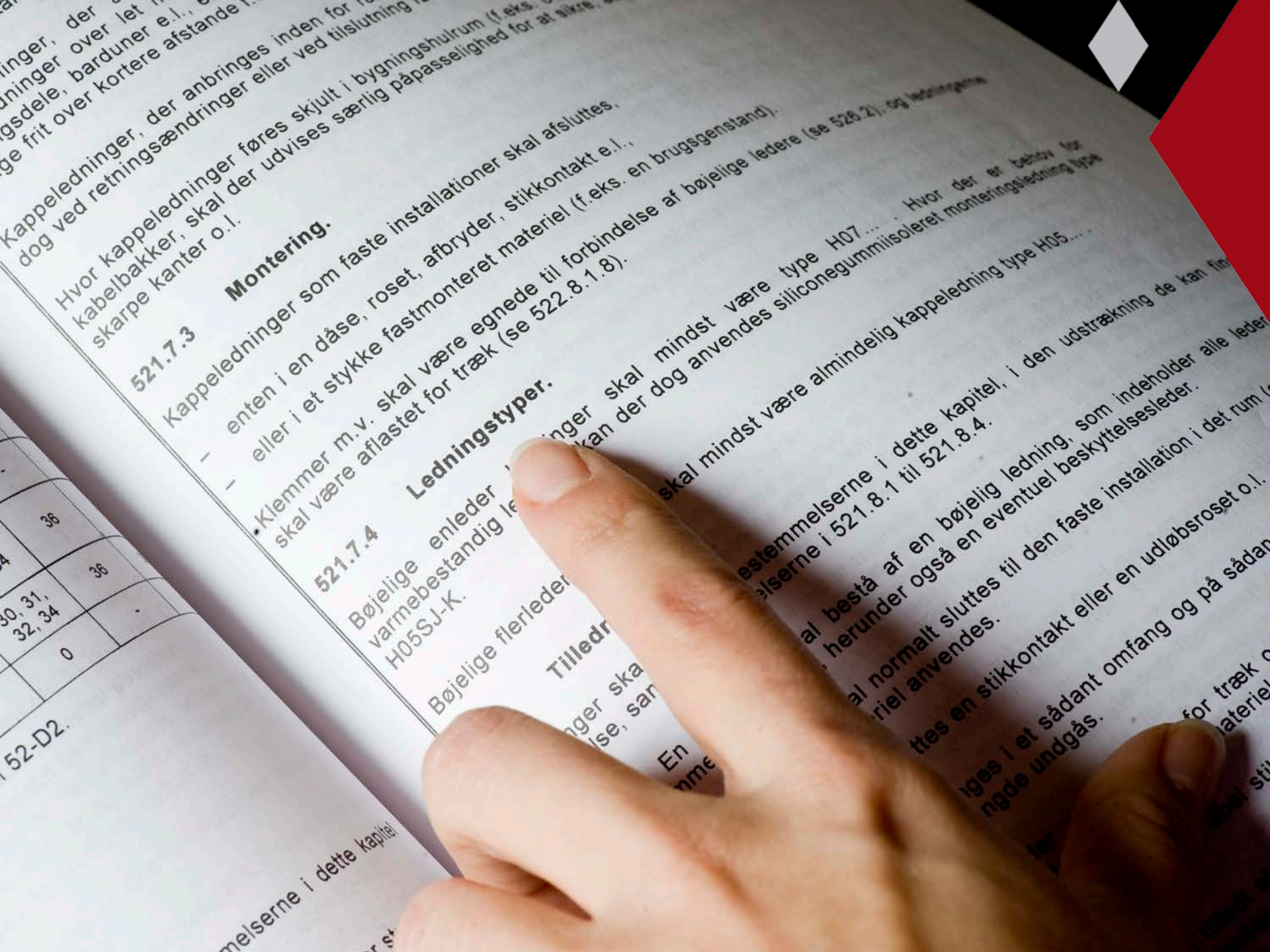


# Ændring af de fremtidige installationsbestemmelser for PV

Selvom den nye **HD 60364-7-712:2015** ikke har forladt trykken, så har man nedsat en arbejdsgruppe, der skal lave den om!

IEC er kraftigt forsinket med den nye IEC 60364-7-712, så den nye europæiske standard baserer sig på et tidligt udkast fra IEC som man har arbejdet videre på.

Nu er man så i den situation at IEC og CENELEC standarderne reelt er forskellige. Det kan man ikke leve med fordi stort set alle produktstandarderne kommer fra IEC og bliver her udviklet så de passer med IEC 60364-7-712.



30, 31, 32, 34	36
0	36

52-D2.

### 521.7.3

#### Montering.

- Kappedninger som faste installationer skal afsluttes, enten i en dåse, roset, afbryder, stikkontakt e.l., eller i et stykke fastmonteret materiel (f.eks. en brugsgenstand).
- Klemmer m.v. skal være egnede til forbindelse af bøjelige ledere (se 522.8.1.8).

### 521.7.4

#### Ledningstyper.

Bøjelige enleder varmebestandig ledning H05SJ-K.

Bøjelige flerleder

#### Tilledr

inger ska  
se, sam

En  
nme

skal mindst være type H07... Hvor der er behov for kan der dog anvendes siliconegummiisoleret monteringsledning type H05...

Bestemmelserne i dette kapitel, i den udstrækning de kan finde anvendelse i 521.8.1 til 521.8.4.

skal mindst være almindelig kappedning type H05... al bestå af en bøjelig ledning, som indeholder alle ledere herunder også en eventuel beskyttelsesleder.

skal normalt sluttes til den faste installation i det rum (eller rum) hvor den anvendes.

skal monteres med en stikkontakt eller en udløbsroset o.l. og skal beskyttes i et sådant omfang og på sådan en måde, at ingen ledende dele kan komme i berøring med ledningen.

for træk o  
materiel  
stir

Bestemmelserne i dette kapitel