

# Recommended Standards for adoption by 10th General Assembly

## Reviewed Standards and Recommended for Adoption by ATC 8

|   | List of standards     | Standard Title   |
|---|-----------------------|--|
| 1 | IEC TS 63222-2:2023   | Power Quality management – Part 2: Power quality monitoring system |
| 2 | IEC TR 63222-101:2025 | Power Quality management-Part101: Power quality data application   |
| 3 | IEC 60038:2023        | Standard voltage values  |

### **3 IEC Standards**

## Reviewed Standards and Recommended for Adoption by ATC 13

|   | List of standards     | Standard Title  |
|---|-----------------------|---|
| 1 | IEC 62057-1:2023      | Electrical energy meters - Test equipment, techniques and procedures - Part 1: Stationary meter test units (MTUs)   |
| 2 | IEC 62056-8-12:2023   | Electricity metering data exchange – The DLMS®/COSEM suite - Part 8-12: Communication profile for Low-Power Wide Area Networks (LPWANs)                                       |
| 3 | IEC 62052-31:2024     | Electricity metering equipment - General requirements, tests and test conditions - Part 31: Product safety requirements and tests   |
| 4 | IEC 62057-3:2024      | Electrical energy meters - Test equipment, techniques and procedures - Part 3: Automatic meter testing system (AMTS)  |
| 5 | IEC 62052-21:2020     | Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Part 21: Tariff and load control equipment  |
| 6 | IEC 62053-31:1998     | Electricity metering equipment (a.c.) - Particular requirements - Part 31: Pulse output devices for electromechanical and electronic meters (two wires only)                  |
| 7 | IEC TS 62056-9-1:2016 | Electricity metering data exchange - The DLMS/COSEM suite - Part 9-1: Communication profile using web-services to access a DLMS/COSEM server via a COSEM Access Service (CAS) |

### **7 IEC Standards**

**Reviewed Standards and Recommended for Adoption by ATC 57**

|    | <b>List of standards</b> | <b>Standard Title</b>   |
|----|--------------------------|---|
| 1  | ISO/IEC 30144:2020       | Internet of things (IoT) - Wireless sensor network system supporting elect power substation   |
| 2  | ISO/IEC 30141:2024       | Internet of things (IoT) - Reference architecture   |
| 3  | ISO/IEC 30101:2014       | Info. technology-Sensor networks: Sensor network and its interfaces for smart grid system   |
| 4  | ISO/IEC 21823-1:2019     | Internet of Things (IoT) - Interoperability for IoT systems - Part 1: Framework   |
| 5  | ISO/IEC TS 8200:2024     | Information technology - Artificial intelligence - Controllability of automated AI systems  |
| 6  | ISO/IEC 5259-3:2024      | AI - Data quality for analytics and machine learning (ML) - Part 3: Data quality management requirements and guidelines                                       |
| 7  | ISO/IEC 5259-1:2024      | AI - Data quality for analytics & machine learning (ML) - Part 1: Overview, terminology, and examples   |
| 8  | ISO/IEC 5259-2:2024      | AI - Data quality for analytics and machine learning (ML) - Part 2: Data quality measures   |
| 9  | ISO/IEC 5259-4:2024      | AI - Data quality for analytics and machine learning (ML) - Part 4: Data quality process framework  |
| 10 | IEC 60870-5-101:2003     | Telecontrol equipment and systems - Part 5-101: Transmission protocols - Companion standard for basic telecontrol tasks                                       |
| 11 | IEC 60870-5-104:2006     | Telecontrol equipment and systems – Part 5-104: Transmission protocols – Network access for IEC 60870-5-101 using standard transport profiles                 |
| 12 | IEC 60870-6-2:1995       | Telecontrol equipment and systems - Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations - Section 2: Use of basic standards |
| 13 | IEC 61970-1:2025         | Energy management system application program interface (EMS-API) – Part 1: Guidelines and general requirements  |
| 14 | IEC 62443-1-1-2009       | Industrial communication networks - Network and system security - Part 1-1: Terminology, concepts and models  |
| 15 | IEEE 1646-2004           | Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation  |
| 16 | IEEE 1686- 2022          | Intelligent Electronic Devices Cybersecurity Capabilities   |
| 17 | IEEE 1815-2012           | Electric Power Systems Communications-Distributed Network Protocol (DNP3)   |
| 18 | ISO/IEC 30161-1:2020     | Internet of Things (IoT) data exchange platform for IoT service Part 1: General Requirement and architecture  |

**15 IEC Standards + 3 IEEE Standards**

**Reviewed Standards and Recommended for Adoption by ATC 64**

|   | <b>List of standards</b> | <b>Standard Title</b>  |
|---|--------------------------|--|
| 1 | IEEE 2030.10:2021        | IEEE Standard for DC Microgrids for Rural and Remote Electricity Access Applications |

**1 IEEE Standards**

### Reviewed Standards and Recommended for Adoption by ATC 77

|   | List of standards                      | Standard Title  |
|---|--|---|
| 1 | IEC 61000-3-12:2011/AMD1:2021          | Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage system |
| 2 | IEC 61000-3-2:2018/AMD1:2020/AMD2:2024 | Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)      |
| 3 | IEEE 1453-2022                         | Measurement and Limits of Voltage Fluctuations and Associated Light Flicker on AC Power Systems   |
| 4 | IEEE 519-2022                          | Standard for Harmonic Control in Electric Power Systems.  |

**2 IEC Standards + 2 IEEE Standards**

### Reviewed Standards and Recommended for Adoption by ATC 82

|   | List of Standards | Standard Title   |
|---|-------------------|--|
| 1 | IEC TR 63149      | Land Usage of Photovoltaic (Pv) Farms - Mathematical Models and Calculation Examples |
| 2 | IEC 62891:2020    | Maximum Power Point Tracking Efficiency of Grid Connected Photovoltaic Inverters     |
| 3 | IEEE 1020-2011    | Guide for Control of Small (100 kVA to 5 MVA) Hydroelectric Power Plants             |

**2 IEC Standards + 1 IEEE Standard**

### Reviewed Standards and Recommended for Adoption by ATC-EV

|   | List of Standards | Standard Title  |
|---|-------------------|---|
| 1 | IEC 62196-1:2022  | Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements  |
| 2 | IEC 62196-2:2022  | Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories                |
| 3 | IEC 62196-3:2022  | Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers |
| 4 | IEC 62752:2024    | In-cable control and protection device (IC-CPD) for mode 2 charging of electric road vehicles   |
| 5 | IEC 62909-1:2017  | Bi-directional grid connected power converters - Part 1: General requirements   |
| 6 | IEC 62909-2:2019  | Bi-directional grid-connected power converters - Part 2: Interface of GCPC and distributed energy resources   |
| 7 | IEC 61439-7:2023  | Low-voltage switchgear and controlgear assemblies - Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicle charging stations                             |
| 8 | IEC 63584:2024    | Open Charge Point Protocol (OCPP)   |
| 9 | IEEE 2030.5-2023  | Smart Energy Profile Application Protocol   |

**8 IEC Standards + 1 IEEE Standard**

**Reviewed Standards and Recommended For Adoption by AJWG1**  
**“ Guidelines For Grid Integration of**  
**Renewable Energy Generation in Africa”**

|    | <b>List of Standards</b> | <b>Standard Title</b>   |
|----|--------------------------|---|
| 1  | IEC 61000-3-3            | Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection |
| 2  | IEC 62109-1              | Safety of power converters for use in photovoltaic power systems - Part 1: General requirements   |
| 3  | IEC 62109-2:2011         | Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters  |
| 4  | IEC 62116:2014           | Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures   |
| 5  | IEC 60870-5-101          | Telecontrol equipment and systems - Part 5-101: Transmission protocols - Companion standard for basic telecontrol tasks   |
| 6  | IEC 60870-5-104          | Telecontrol equipment and systems - Part 5-104: Transmission protocols - Network access for IEC 60870-5-101 using standard transport profiles   |
| 7  | IEC 60870-6-502          | Telecontrol equipment and systems - Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations - Section 502: TASE.1 Protocol definitions  |
| 8  | IEC TS 62933-1           | Electrical energy storage (EES) systems - Part 1: Vocabulary  |
| 9  | IEC TS 62933-3-1         | Electrical energy storage (EES) systems - Part 3-1: Planning and performance assessment of electrical energy storage systems - General specification  |
| 10 | IEC TS 62933-3-2         | Electrical energy storage (EES) systems - Part 3-2: Planning and performance assessment of electrical energy storage systems - Additional requirements for power intensive and renewable energy sources integration related applications                        |
| 11 | IEC 61400-21-1           | Wind energy generation systems - Part 21-1: Measurement and assessment of electrical characteristics - Wind turbines  |
| 12 | IEC 61000-4-15           | Electromagnetic compatibility (EMC) - Part 4-15: Testing and measurement techniques - Flickermeter - Functional and design specifications   |
| 13 | IEC 62446-2              | Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 2: Grid connected systems - Maintenance of PV systems  |
| 14 | IEC TR 63401-1           | Dynamic characteristics of inverter-based resources in bulk power systems - Part 1: Interconnecting inverter-based resources to low short circuit ratio AC networks   |
| 15 | IEC TR 63401-2           | Dynamic characteristics of inverter-based resources in bulk power systems - Part 2: Sub- and Super-synchronous control Interactions   |
| 16 | IEC TR 63401-3           | Dynamic characteristics of inverter-based resources in bulk power systems - Part 3: Fast frequency response and frequency ride-through from inverter-based resources during severe frequency disturbances   |
| 17 | IEC TR 63401-4           | Dynamic characteristics of inverter-based resources in bulk power systems - Part 4: Behaviour of inverter-based resources in response to bulk grid faults   |
| 18 | IEC TS 63102             | Grid code compliance assessment methods for grid connection of wind and PV power plants   |
| 19 | IEC TS 62910             | Utility-interconnected photovoltaic inverters - Test procedure for under voltage ride-through measurements  |
| 20 | IEC TS 63217             | Utility-interconnected photovoltaic inverters - Test procedure for over voltage ride-through measurements   |
| 21 | IEC TS 62786-1           | Distributed energy resources connection with the grid - Part 1: General requirements  |
| 22 | IEC TS 63060             | Electric energy supply networks - General aspects and methods for the maintenance of installations and equipment  |
| 23 | IEC TS 63222-1           | Power quality management - Part 1: General guidelines   |
| 24 | IEC 60227-1              | Polyvinyl Chloride Insulated Cables   |
| 25 | IEC 62934:2021           | Grid integration of renewable energy generation - Terms and definitions   |
| 26 | IEC 62619:2022           | Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications  |

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|----|---------------------|--|
| 27 | IEC 60255-121:2014  | Measuring relays and protection equipment - Part 121: Functional requirements for distance protection  |
| 28 | IEC 60255-127:2010  | Measuring relays and protection equipment - Part 127: Functional requirements for over/under voltage protection  |
| 29 | IEC 63056:2020      | Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries for use in electrical energy storage systems            |
| 30 | IEC 62933-2-1       | Electrical energy storage (EES) systems – Part 2-1: Unit parameters and testing methods – General specification  |
| 31 | IEC 62933-4-2       | Electric energy storage (EES) systems – Part 4-2: Guidance on environmental issues – Assessment of the environmental impact of battery failure in an electrochemical based storage system                |
| 32 | IEC 62933-4-3       | Electrical energy storage (EES) systems – Part 4-3: Protection   |
| 33 | IEC 61400-12-1:2022 | Wind energy generation systems - Part 12-1: Power performance measurements of electricity producing wind turbines  |
| 34 | IEC 60041:1991      | Field acceptance tests to determine the hydraulic performance of hydraulic turbines, storage pumps and pump-turbines   |
| 35 | IEC 61215-1         | Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements   |
| 36 | IEC 61730-1         | Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements   |
| 37 | IEC 61730-2         | Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing   |
| 38 | IEC TS 61724-3:2016 | Photovoltaic system performance - Part 3: Energy evaluation method   |
| 39 | IEC 62548:2023      | Photovoltaic (PV) arrays – Design requirements   |
| 40 | IEC 60909-0         | Short-circuit currents in three-phase a.c. systems - Part 0: Calculation of currents   |
| 41 | IEC 60255-181:2019  | Measuring relays and protection equipment - Part 181: Functional requirements for frequency protection   |
| 42 | IEC 60255-187:2021  | Measuring relays and protection equipment - Part 187-1: Functional requirements for differential protection - Restrained and unrestrained differential protection of motors, generators and transformers |
| 43 | IEC TS 62898-1:2017 | Microgrids - Part 1: Guidelines for microgrid projects planning and specification  |
| 44 | IEC 61936-1         | Power Installations exceeding 1kV AC and 1.5kV DC Part 1: AC   |
| 45 | IEEE 1547.1-2020    | Interconnection and Interoperability of Distributed Energy Resources   |

### **44 IEC Standards + 1 IEEE Standard**

**Total of 90 Standards (IEC+IEEE)  
81 IEC Standards + 9 IEEE Standards**