भारत सरकार/ Government of India
विद्युत मंत्रालय/ Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority
विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग
Power System Engineering & Technology Development Division

सेवा में,

All Stakeholders

विषय: Issuance of revised "Guidelines for the Type Tests for Major Equipment of Power Sector" and "Guidelines for Model Quality Assurance Plan (MQAP) for Major Equipment of Power Sector" – reg.

महोदय/ महोदया/ Sir/ Madam,

Central Electricity Authority has issued the following two Guidelines in March, 2022:

(i) Guidelines for the Type Tests for Major Equipment of Power sector
(ii) Guidelines for Model Quality Assurance Plan (MQAP) for Major Equipment of Power Sector.

"Guidelines for the Type Tests Validity for Major Equipment of Power Sector" have been issued with the objective of setting uniformity in the periodicity of Type Tests in respect of various equipment. "Guidelines for Model Quality Assurance Plan (MQAP) for Major Equipment of Power Sector" have been issued with the objective of bringing uniformity in QAPs being followed by different manufacturers, utilities, etc. in respect of various equipment.

Subsequently, these Guidelines have also been made mandatory by incorporating them in Regulations 3(5)(b) and 3(6) respectively in Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022 that have been notified on 23rd December, 2022.

Later, on the basis of direction received from MoP w.r.t. modifying MQAP Guidelines for Distribution Sector, and representations received from various stakeholders to modify the periodicity of the Type Tests of various equipment, a comprehensive exercise has been undertaken to review the above mentioned Guidelines. The revised Draft Guidelines, namely,

Draft **"Guidelines for the Type Tests for Major Equipment of Power Sector"** and Draft **"Guidelines for Model Quality Assurance Plan (MQAP) for Major Equipment of Power Sector"** have been circulated vide CEA letter dated 18.08.2025 to stakeholders for furnishing comments by 17.09.2025. The comments received have been suitably considered and appropriately incorporated in the said Guidelines. The revised approved Guidelines, viz., **"Guidelines for the Type Tests for Major Equipment of Power Sector"** and **"Guidelines for Model Quality Assurance Plan (MQAP) for Major Equipment of Power Sector"** are hereby issued for compliance by all concerned.

These Guidelines shall supersede earlier Guidelines issued by CEA in March, 2022, and shall be applicable with immediate effect.

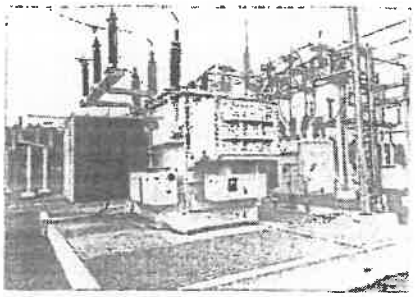
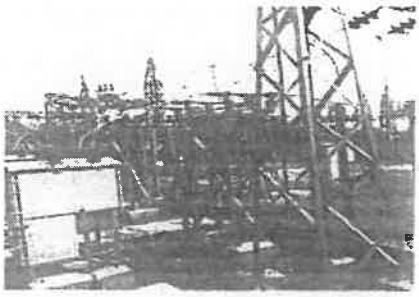
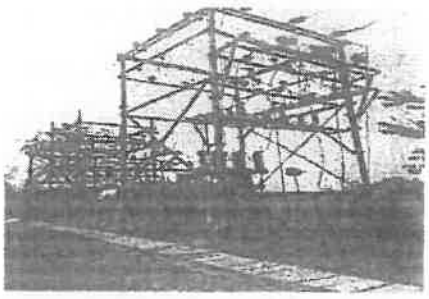
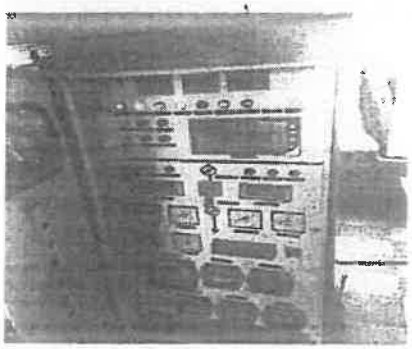
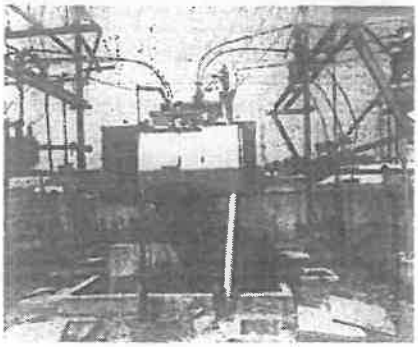
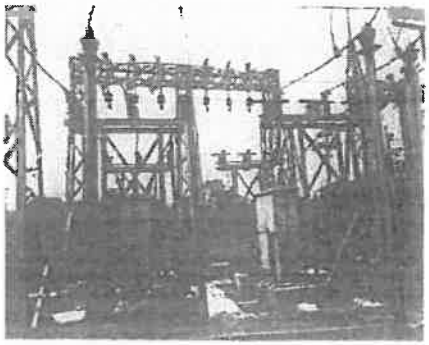
This issues with the approval of Competent Authority.

भवदीय/ Your Faithfully,

Digitally signed by
N.R.L.K. Prasad
Date: 19-01-2026
11:26:30

(एन. आर. एल. के. प्रसाद/ N.R.L.K. Prasad)
मुख्य अभियंता/Chief Engineer

Guidelines for the Type Tests for Major Equipment of Power Sector

भारत सरकार

GOVERNMENT OF INDIA

विद्युत मंत्रालय

MINISTRY OF POWER

केन्द्रीय विद्युत प्राधिकरण

CENTRAL ELECTRICITY AUTHORITY

January 2026

Guidelines for the Type Tests for Major Equipment in Power Sector

1. Background

Prior to commercialization of the equipment/ product, the equipment/ product passes through the product development stages. The equipment/ product must successfully pass the relevant tests (as specified in the applicable standards), in an accredited laboratory such as the one accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) before the commercialization of the product/ equipment/material. One of such tests is a **"type test"** which is generally performed on any equipment conforming to relevant National/ International Standards to **'validate the design and quality'** and to demonstrate its functional requirement for meeting the intended applications. The word "equipment" used in this document refers to all items listed in the Tables in this document.

These tests are also called **'Proof Tests' or 'Design and Quality Validation Tests'**. Such tests are performed on a representative design of the equipment. Type test is a design and quality validation test, and the purchaser must satisfy itself by following an agreed quality assurance plan and special tests, if any, agreed between the buyer and the supplier/manufacturer.

The utility shall not reject the product/ equipment for supply against the contract on technical ground, if the subject product/ equipment has successfully passed the type test as per relevant Standards. In this document, "Standard" means Indian Standard and in absence of Indian Standard, International Electro-technical Commission Standard, Institute of Electrical and Electronic Engineers Standard, European Norms Standard, other equivalent Foreign Standard in the sequence of their appearance.

However, successfully type tested equipment does not guarantee that there will be no failure of the equipment at all, as the equipment is likely to encounter various electrical, mechanical, thermal and environmental stresses and abnormal conditions during its service life which may not match exactly with the conditions simulated during the 'type test'.

Most of the utilities in India specify that the type test be repeated after certain years of issue of the test report in respect of equipment being tendered.

The insistence on repetition of type tests by some utilities in India, even if the equipment has remained essentially the same (in terms of basic design, material, and manufacturing process, etc.) has become a matter of concern (as it involves cost, transportation to Testing Lab and time). The practice of demanding re-conduction of type test (i.e. periodicity of type test) varies from utility to utility. Some utilities do not accept type tests conducted earlier on the equipment and demand for repetition of type test(s) in their purchase procedure. However, sometimes, testing time exceeds the entire production process time e.g. in case of over voltage cycling test for capacitors etc. Facilities for some of the type tests for some of the equipment are not available in India for which these equipment have to be sent to the test facilities abroad for testing.

In view of the representations and feedback received from manufacturers regarding type test requirements mandated by the utilities in their specifications, and considering the request of the manufacturers to make the periodicity of type tests in respect of a particular equipment uniform (reasonable duration), the Guidelines for the Type Tests for Major Equipment in the Power Sector were issued by CEA in the year 2022. The aim was also to mitigate the uncertainty among the manufacturers. These guidelines had been formulated to avoid stress/burden on national resources, save time and money entailed in repetition of type tests, and to alleviate the associated burden of cost on the end consumers.

During the period of operation of these Guidelines, representations have been received from stakeholders for bringing uniformity in the periodicity of type test for the same/ similar class of equipment, irrespective of its application. Ministry of Power also advised Central Electricity Authority (CEA) to consider extending the validity period of type test reports for some equipment.

Considering the above, an exercise has been undertaken to revise the said guidelines. The principles of rationality, uniformity across all domains of electric systems for a class of equipment, reasonableness of the periodicity of type test, working principles, availability of the testing facilities, etc. have been considered in the determination of the periodicity of type test in these guidelines.

2. Purpose of the Guidelines for the Periodicity of Type Test(s)

The purpose of publication of these guidelines is as below:

a) **To set uniformity in the periodicity of type tests:** It has been observed that different practices are being followed regarding the periodicity of type tests (repetition of type test) for the equipment/ component. Therefore, setting uniformity in the periodicity of type tests on a broader

scale would eliminate subjectivity in the acceptance of Type Test(s) across the utilities/stakeholders.

b) **To reduce the repetitiveness of type tests, wherever possible**: The utilities sometimes insist upon repeat of type test on the equipment even when no major change has been introduced in the basic design/ technology/ material/ mechanical construction/ functionalities of the equipment/ performance characteristic/specifications/ standards of the equipment.

Specifying the periodicity of Type Test would ensure that the equipment is not subjected to test repetitively unless warranted due to the aforesaid reasons for type test. This would result in saving of cost as well as time and resources for all the stakeholders viz manufacturers, vendors, utilities, equipment users etc. and ultimately for the end consumer.

c) **To avoid overloading of /long waiting at testing facilities:**

Repeating the type tests on the same equipment without judicious reasons would create the capacity constraints for the testing infrastructure for type testing.

Thus, setting uniform and rational periodicity of type tests will significantly reduce, if not eliminate the unnecessary repetition of type testing. This will ensure availability of testing infrastructure for type testing of new equipment/ modified equipment/ products needed for Research and Development (R&D) and commercial requirements.

3. Broad Guidelines

a) The type tests on equipment, for which testing facility is available in India, shall preferably be conducted in India in any independent laboratory approved by the Government or the laboratories accredited by the National Accreditation Body of the Country.

b) The type tests on indigenous equipment, for which testing facility is not available in India, shall be conducted in a laboratory of a foreign Country accredited by the National Accreditation Body of that Country.

c) The type tests on imported equipment shall be conducted in an Indian laboratory or foreign laboratory accredited by the National Accreditation Body of the Country where the type test has been conducted

d) The type tests conducted in-house by a manufacturer shall also be acceptable provided the laboratory is accredited by the National Accreditation Body of the Country and the test has been conducted in the presence of a representative of NABL accredited laboratory or any of the purchasing utilities or CEA in that order. Such type test report shall record the details of such witness including the signature/ authentication in the type test report.

In case of in-house type-tested imported equipment of foreign OEM, the term "Purchasing Utility" covers the foreign Utility who has purchased that Equipment.

e) The result of all type tests shall be recorded properly in the Type Test Reports (TTRs) containing sufficient information like ratings, relevant drawings, model number, test circuit, calculations (if any), photographs and compliance to the relevant standards. The relevant clauses of the standards according to which type tests have been conducted and acceptance criteria/values need to be brought out clearly in the report.

f) The date of the type test report shall be reckoned from the date of issuance of the complete type test report. The type test report should be issued by the laboratory within 15 days from the date of completion of the last test of the series of tests under the type test of that equipment as per the relevant standards. In case type test report including the provisional 'type test' report is not issued within 15 days, type test report shall be reckoned from the 15th day of completion of the last test of the series of test under the type test. The type test report should have the traceability.

g) It may be noted that in general, the type test need not be repeated unless there is (i) change in the design, or (ii) change in material, or (iii) change in the manufacturing process, or (iv) amendment/ revision in the relevant standard as regard to type test conditions. The periodicity of type test conducted on the equipment i.e., the period for which Type Test Reports (TTRs) shall be acceptable by the user/ utility, and shall be as per given **Annexures [Annexure-I (Transmission), Annexure-II (Distribution), Annexure-III (Thermal), Annexure-IV (Hydro)]**. The user needs to exercise adequate measures to ensure the quality of the product by following a mutually agreed "Quality Assurance Plan (QAP)".

h) For the purpose of deciding the acceptability of the type test reports, the date of issue of the type test report shall be reckoned with reference to the date of the submission of the bid by the bidder.

That is the type test report in respect of the concerned equipment shall not be older than the period specified in these Guidelines as on the date of submission of the bid by the bidder.

i) Type test report of 220 kV voltage class equipment shall be valid for 230 kV voltage class equipment and vice versa as the highest system voltage is same in both the cases provided the Basic Insulation Level (BIL) is same.

j) All the testing equipment used for type testing shall be duly calibrated and the valid calibration reports shall form part of the Type Test Reports.

k) The equipment shall be supplied from the same manufacturing works, where from the sample unit was manufactured and successfully type tested as per relevant standard or at the works of Parent organization in case of technology transfer/ Joint Venture (JV) for the initial period of 03 years from the date of establishment of manufacturing plant.

In case of own manufacturing plant at different location within India, the type test of the original manufacturing works shall also be acceptable for the equipment manufactured and supplied from the different location subject to the following conditions:

(i) the relevant standard does not bar the same,

(ii) the equipment being manufactured at different locations shall be identical in design, drawings, specifications, ratings to that of the type tested sample in the original facility (where it was manufactured and successfully type tested),

(iii) the equipment being manufactured at different locations shall be identical in material & critical components, manufacturing process/ practices, and quality control to that of the type tested sample in the original facility (where it was manufactured and successfully type tested),

(iv) Also, while submitting the Type Test Reports, the Original Equipment Manufacturer (OEM), shall furnish an undertaking for above conditions (i), (ii) and (iii).

In case failure(s) of the equipment manufactured & supplied from that location is reported to the Authority, the Authority shall direct the concerned manufacturer to conduct Type Test for that equipment manufactured & supplied from that location. Till the time Type Test is conducted successfully, the manufacturer shall not manufacture & supply such equipment from that location.

l) In case of Gas Insulated Switch gear (GIS) and Hybrid switchgear, Type Test Reports of parent company/ collaborator or its subsidiary situated in other country, may be accepted provided same design, material, and process by which parent company/ collaborator or its subsidiary has manufactured the equipment, has been followed by the Indian manufacturer plant.

m) The type tests shall be repeated if there is change in technology or basic design or material or manufacturing process or combination of any of the above or the type testing criteria in the respective Standards have undergone a change/ amendment/ revision. However, minor changes within design tolerances given in relevant standard and which have no effect on the functionality and reliability of the equipment, may not require repetition of type tests. Minor changes do not include an increase in electrical stress, thermal stress, mechanical stress, change in construction, change in dielectric material, impregnating oil, thickness of electrode and internal fuse design in a capacitor, enclosure materials (magnetic, non-magnetic like stainless steel, Aluminum) etc. The OEM/ manufacturer shall submit an undertaking to this effect. In case of major changes in the Standard, relevant tests encompassing all revised parameters would be repeated.

n) If relevant Standard of the equipment is revised or amended in case of type test criteria, fresh type test is warranted even if equipment has not changed in design/ material/ manufacturing process, etc. However, fresh type testing shall be limited to only those tests for which test procedure/ method, any technical requirement or parameters to be tested have been changed in the revised Standards. In such cases, enough time as mutually agreed between the user and manufacturer, shall be given to manufacturer to comply with the revised provision in the Standards.

o) The utilities shall co-relate the need of repeating type test(s) to changes in design/ technology and may emphasize/ insist for stage inspection/quality check and hold points to ensure quality of the component/ material used in the manufacturing of the equipment.

p) The change in the make of component(s) of the equipment shall not be the criteria for repetition of type tests for the equipment provided that the component of new make has been successfully type tested and its use shall not affect the functionality, performance and reliability of the equipment. The type test reports of the component of new make shall be submitted.

q) The utilities, if they so desire, may demand the repeat of the type tests, at their own cost even if valid TTRs have already been provided by the bidder/ manufacturer. However, the utilities should refrain from making it as a regular practice. The utility shall clearly specify which type tests shall be repeated in the event of award of the contract and quotation for such tests shall be invited separately in the price bid. In such case, utility shall provide extra time for repetition of such type tests.

r) While submitting the Type Test Reports, the Original Equipment Manufacturer (OEM), shall furnish an undertaking with it declaring that there is:

i) No change in the Design
ii) No change in the material,
iii) No change in manufacturing process, and
iv) No amendment/revision in the relevant standard as regard to type test conditions, since the type test.

s) The philosophy of extending type test results of the equipment is based on two primary factors: similar design and design with lower stresses (electrical, mechanical, thermal, and environmental). Validity of type test report of an equipment can be extended to the same equipment of similar design and/or lower design stress provided relevant standard permits. In all the cases, it shall be ensured that material and manufacturing process involved remain same.

t) It is practically impossible to subject all possible arrangements of the Gas Insulated Switchgear (GIS) (for a particular switching scheme corresponding to a specified voltage level) to type tests as various arrangements are possible using same combination of equipment depending on layout arrangement and space availability. The performance of any arrangement shall be substantiated from type test results obtained on representative assemblies or sub-assemblies. The user shall check to ensure that the tested sub-assemblies shall be a 'representative form' of the user's arrangement and meet the desired requirement/ objective.

u) For HV capacitors (voltage >1 kV): The successful completion of each type test shall be valid for units which are having lower design stress, same manufacturing process and same material properties.

v) For LV capacitors (voltage <1 kV): The successful completion of each type test shall also be valid for units having same rated voltage and lower output kVAR provided that they do not differ in any way

(in design, material and manufacturing process etc.) that may influence the properties to be checked by the type test.

w) **Guidelines specifically applicable to Hydro Power Sector**

i. The design of turbine/ pump-turbine/ reversible turbine along with its various components/ parts/ sub-assemblies varies based on various parameters such as available head, discharge, dimension of water conductor system, capacity, etc to achieve an optimum performance and efficiency, and hence are specific to the project and tailor-made. Not only the type of turbine (Kaplan/ Francis/ Pelton, etc) differs based on the available head, but various components of a particular turbine, viz. runner, guide apparatus, stay and guide rings, head cover, turbine shaft, shaft seal, bearings, governor system, etc. also differ depending upon the requirements of different projects. As such, it is not possible to specify uniform Type Test for different types of turbine/ pump-turbine/ reversible turbine along with its various components/ parts/ sub-assemblies. Hence, only those components of turbine auxiliaries are included herein for which Type Test periodicity could be specified for a longer period and which do not undergo major changes.

ii. The design of Synchronous/ Asynchronous Machine/ Generator-Motor along with its various components/ parts/ sub-assemblies depend on various parameters such as MW rating, Voltage level, Current Level, specific speed, number of poles, head and type of turbine used, run-away speed, etc similar to the case of turbines, different types of generators (umbrella, semi-umbrella or suspended type) are selected depending upon the project requirements. Further, their components such as rotor, stator, windings, shaft, bracket, bearings, etc. are uniquely designed for each project. As such, it is not possible to specify uniform type test validity period for different types of Generators along with its various components.

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Annexure-I

Equipment used in Transmission Sector (66 kV & above Voltage level)

Sl. No.	Name of Equipment	Periodicity (in years)
1.	Power Transformer (ICT/ Auto Transformer)	10
2.	Shunt Reactor/ Series Reactor/ Neutral Grounding Reactor	10
3.	On Load Tap Changer (OLTC)	10
4.	Bushing for Power Transformer/ Reactor	10
5.	Transformer/ Reactor fittings and Accessories	10
6.	Circuit Breaker (Live Tank/ Dead Tank)	15
7.	Isolator	15
8.	Lightning Arrester	15
9.	Wave Trap	15
10.	Instrument Transformers	15
11.	Control & Relay Panel	10
12.	Gas Insulated Switchgear (GIS) and Hybrid Switchgear	15
13.	Cables and associated Joints	10
14.	Capacitor / Capacitor Bank	10
15.	Numerical Relays/ BCPU/ BCU/ Process Interface Unit (PIU)/ Stand-alone merging unit (SAMU)/ Transformer Monitoring Unit (TMU).	10
16.	Remote Terminal Unit (RTU)	10
17.	Insulators	10
18.	Insulators hardware fittings, and accessories for conductor and ground wire	10
19.	PLCC/ Fiber Optic cable/Fiber Optical Terminal Equipment (FOTE)/OPGW	10
20.	Battery and Charger	10
21.	Substation Automation System	10
22.	Conductors and earth wire	10
23.	High Temperature Low Sag (HTLS) conductor	10
24.	Energy Meter (ABT meters)	5
25.	Power Quality (PQ) Meter	5
26.	Phasor Measurement Unit (PMU)	10
27.	Diesel Generating (DG) Set	10
28.	Partial Discharge Measurement System	10
29.	Online DGA system	10

Annexure-II

Equipment used in Distribution Sector (below 66 kV Voltage level)

Sl. No.	Name of Equipment	Validity Period (in years)
1	Power Transformer	5
2	Distribution Transformers (single phase and Three phase).	5
3	Circuit Breaker	5
4	Air Break Switches	5
5	Isolators	5
6	Lightning Arrester	5
7	Instrument Transformers (CT/PT/CVT)	5
8	Control and Relay Panel (LV and MV)	5
9	XLPE Cable and Termination Kits Aerial Bunched Cables & associated Accessories	5
10	11 kV Capacitor/ Capacitor Bank	5
11	Energy Meters • Electronic Meter • Smart Meter	 5 5
12	Batteries and Charger	5
13	Conductors (ACSR/AAAC) & associated Accessories	5
14	Insulators	5
15	Ring Main Unit (RMU)	5
16	Remote Terminal Units/Feeder Remote Terminal units	10
17	Fault Passage Indicators	10
18	Gas Insulated Switchgear (GIS) / Hybrid Switchgear	15

Annexure-III

Equipment used in Thermal Sector

List of major mechanical equipment:		
Sl. No.	**Name of Equipment**	**Periodicity (in years)**
1.	Butterfly Valves (Water Application)	5
2.	GRP (Glass Reinforced Pipes)	5
3.	3 LPE Coated MS Pipes	5
4.	Metallic Expansion Joint	5
5.	Rubber Expansion Joint ≥ 2300 NB	5
6.	Drift Eliminators	5
7.	Cooling Tower Fills	5
8.	Dual Plate Check Valve	5
9.	Main Turbine Oil Purifier	5
10.	Drive Turbine Oil Purifier	5
11.	Boiler Feed Pump	5
12.	Condenser Air Evacuation System	5
13.	Condensate Extraction Pump	5
14.	Drip Pump	5
15.	Boiler Circulating Pump	5
16.	Light Resin Bound Mineral Wool	5
17.	Fireproof Door	5
18.	ID Fan	5
19.	FD Fan	5
20.	PA Fan	5
21.	Seal Air Fan	5
22.	Dampers/ Gates	5
23.	Gravimetric Coal Feeder	5
24.	CW Pump	5
25.	CT gearbox	5

List of major C&I Equipment:		
Sl. No.	**Name of Equipment**	**Periodicity (in years)**
1.	Control valve	10
2.	UPS	10
3.	PA System	10
4.	Transducers	10
5.	Electronic Transmitters	10

6.	Dust emission Monitor	10
7.	Instrument cable/ Control Cable	10
8.	Power supply	10
9.	Battery	10
10.	LIE	10
11.	Flue gas analysers	10
12.	Master Clock	10
13	Junction boxes	10
14.	Flow nozzle	10
15.	Electronic measuring instruments	10
16.	DDCMIS	10
17.	PLC	10

List of Major Electrical Items

Sl. No.	Name of Equipment	Periodicity (in years)
1.	Power Transformer (GT/ ST/ UT/ ICT)	10
2.	Auxiliary Transformer (Oil filled/ Dry type)	10
3.	Shunt Reactor	10
4.	Neutral Grounding Resistor	10
5.	On Load Tap Changer (OLTC)	10
6.	Bushing for Power Transformer/ Reactor	10
7.	Transformer/ Reactor fittings and Accessories	10
8.	Outdoor Circuit Breaker (Live Tank/ Dead Tank)	15
9.	Outdoor Isolator	15
10.	Outdoor Lightning Arrester	15
11.	Wave Trap	15
12.	Instrument Transformers	15
13.	Gas Insulated Switchgear (GIS) and Hybrid Switchgear	15
14.	Cable termination kits for GIS and Hybrid switchgear (66 kV to 400 kV)	10
15.	Cable termination kits for GIS and Hybrid switchgear (33 kV and below)	10
16.	Cables, associated joints	10
17.	Capacitor / Capacitor Bank	10

18.	Numerical Relays/ BCPU/ BCU/ Process Interface Unit (PIU)/ Stand-alone merging unit (SAMU)/ Transformer Monitoring Unit (TMU).	10
19.	Remote Terminal Unit (RTU)	10
20.	Insulators	10
21.	Insulators hardware fittings, and accessories for conductor and ground wire	10
22.	PLCC/ Fiber Optic cable/Fiber Optical Terminal Equipment (FOTE)/OPGW	10
23.	LV and MV Switchgear	5
24.	Excitation System	10
25.	Battery and Charger	10
26.	Control & Relay Panel	10
27.	Substation Automation System	10
28.	Energy Meter (Electronic meter, Smart meters, prepaid)	5
29.	Energy Meter (ABT meters)	5
30.	Power Quality (PQ) Meter	5
31.	Phasor Measurement Unit (PMU)	10
32.	Isolated Phase Bus Duct (IPBD)/ Segregated Phase Bus Duct (SPBD)/ Non-segregated Phase Bus Duct (SPBD)/ Sandwich Bus Duct	10
33.	Generator Circuit Breaker (GCB)	20
34.	Motor (AC/ DC)	10
35.	Dry Cast Resin type CT, PT, NGT, CVT and CBCT	10
36.	Power Contactors	10
37.	Control Transformers	10
38.	Transformer - Insulating Oil	10
39.	Lighting and Welding Transformer	10
40.	Cable Termination Kit & Straight Through Jointing Kit	10
41.	Galvanised Iron (GI) Cable Trays and GI Cable Tray Flexible Support System	10
42.	Diesel Generating (DG) Set	10
43.	Lighting Fixtures	10
44.	Lightning Mast	10
45.	Variable Frequency Drive (VFD) System	10
46.	In-Line Magnetic Separator/ Suspended Magnet	10
47.	Metal Detector	10
48.	Electro-hydro thruster (EHT) Brake/ EHT Rail Clamps	10
49.	Actuators (Without Integral Starter)	10

50.	Geared Motor	10
51.	Belt Weigher	10
52.	Weigh Bridge	10
53.	Heavy Duty Limit Switches	10
54.	Aviation Light	10
55.	Electro-static Precipitator Transformer Rectifier (ESP-TR) Set	10
56.	ESP-Panel Type Hopper Heater	10
57.	Partial Discharge Measurement System	10
58.	Online DGA system	10

Note: In case of any conflict on the periodicity of similar items in Annexure-I/ Annexure-II, the periodicity mentioned in those Annexures shall be considered.

Annexure-IV

Equipment used in Hydro Sector

Sl. No.	Name of Equipment	Periodicity (in years)
1.	Auxiliaries of Turbine and Governing System a) Turbine Auxiliaries i. Heat Exchanger b) Governing System i. Servo valves	 10 10
2.	Generator Auxiliaries a) Fire Fighting System	 10
3.	Main Inlet Valve/ Penstock Valve a) Spherical Valve/ Butterfly valve i. Servomotor	 10
4.	All types of Pump i. Pump (Oil/Water) ii. Motor (AC/DC)	 10 10
5.	Isolated Phase Bus Duct (IPBD)/ Segregated Phase Bus Duct (SPBD)	10
6.	a) DC Excitation System for Synchronous Machines b) AC Excitation System for Asynchronous Machines	10 10
7.	EOT Crane Auxiliaries i. Motors ii. Brakes iii. Limit Switches iv. Ropes v. Hooks	 10 10 10 10 10
8.	Hydraulic Valves	10
9.	Static Frequency Converter (SFC) system/ Variable-Frequency Drive (VFD)	10
10.	Current Limiting Reactors	10
11.	Generator Circuit Breaker	20
12.	Phase Reversal Disconnecting Switch	20