For BIS Use Only

BUREAU OF INDIAN STANDARDS

MINUTES

Name of the Committee	No. of Meeting	Day	Date	Time	Venue
High Voltage Engineering Sectional Committee, ETD 19	**25th**	**Thursday**	**09 MAY 2024**	**10.30 AM**	**Virtual Meeting (Webex)**

List of members attended the meeting is at **Annexure –1** .

Chairman: Dr. Pradeep Nirgude, In personal Capacity **Member Secretary:** Shri Ritwik Anand

ITEM 0 WELCOME AND OPENING REMARKS BY CHAIRMAN

Dr. Pradeep Nirgude, Chairperson, extended a warm welcome to all the members present in the meeting. He wished all the members for fruitful discussions during the meeting. He also requested members to identify projects related to R&D projects within the scope of committee.

Member Secretary thanked and welcomed all the participants present in the meeting. He requested the committee members to have thorough discussion on each and every agenda point and to arrive at useful conclusion.

The meeting started with a brief introduction of all members.

ITEM 1 CONFIRMATION OF THE MINUTES OF THE LAST MEETING

1.1 There being no comments, the minutes of the 24th meeting of High Voltage Engineering Sectional Committee, ETD 19 held on 04.09.2023 were confirmed.

ITEM 2 ACTIONS ARISING OUT OF PREVIOUS MEETING.

S.N.	Item	Decision of Committee in the Last Meeting.	Minutes
1	**COMPOSITION OF THE SECTIONAL COMMITTEE.**	The committee decided to withdraw nomination of Adani Electricity Limited, Mumbai and Assam Electricity Grid Corporation Limited, Guwahati from the composition due to their lack of participation	Adani Electricity Limited, Mumbai and Assam Electricity Grid Corporation Limited, Guwahati deleted from the composition. The committee noted the information.

2		The committee decided to coopt National Federation of Engineers for Electrical Safety and National Accreditation Board for Certification Bodies (NABCB) in the committee.	National Federation of Engineers for Electrical Safety and National Accreditation Board for Certification Bodies (NABCB) added in the committee. The committee noted the information.
3	ETD 19 (**21901**) - MEASUREMENT OF DC MAGNETIC, AC MAGNETIC AND AC ELECTRIC FIELDS FROM 1 Hz TO 100 Khz WITH REGARD TO EXPOSURE OF HUMAN BEINGS PART 1: REQUIREMENTS FOR MEASURING INSTRUMENTS	Committee decided to send the document for printing.	Printed as IS/IEC 61786-1 : 2013. The committee noted the information.
4	ETD 19 (**21902**) - Measurement of DC Magnetic, AC Magnetic and AC Electric Fields From 1 Hz to 100 kHz with Regard to Exposure of Human Beings Part 2 : Basic standard for measurements	Committee decided to send the document for printing.	Printed as IS/IEC 61786-2 : 2014. The committee noted the information.
5	Doc. ETD 19 (17963) / Revision of IS 15638 (Pt 1) : Instruments and Software Used For Measurements In High-Voltage And High- Current Tests Part 1: Requirements For Instruments For Impulse Tests	Committee decided to send the document for printing.	Printed as IS 15638 (Part 1) : 2023. The committee noted the information.
6	IS (16190) (IEC TS 61936-2:2015) Power installations exceeding 1 kV ac and 15 kV dc Part 2 dc	Committee approved the document for printing.	Printed. The committee noted the information.

ITEM 3 COMPOSITION OF THE SECTIONAL COMMITTEE.

3.1 Committee noted the information provided in **ANNEXURE 1** of the agenda. It was decided that the organizations may share the updated nomination through email wherever updation is required .

3.2 The committee decided to withdraw nomination of **ABB India Limited-Bengaluru** , **Haryana Vidyut Prasaran Nigam Limited-Panchkula , Indian Institute of Science, Bengaluru and Tata Consulting Engineers Limited, Navi Mumbai** from the composition due to their lack of participation.

3.3 It was also decided that the committee shall make efforts to create awareness among the academic institutions. Members were requested to provide contact details of technical expert of Academic Institutions relevant to the scope of the committee.

ITEM 4 DRAFT INDIAN STANDARDS UNDER WIDE CIRULATION

SI.NO	IS NO	TITLE	MINUTES
1	ETD/19/23933 IS 15382 : Part 4: 2017 (Identical To: IEC 60664-4-2005)	INSULATION COORDINATION FOR EQUIPMENT WITHIN LOW-VOLTAGE SYSTEMS PART 4: CONSIDERATION OF HIGH-FREQUENCY VOLTAGE STRESS	*The documents was wide circulated as vide email dated 23 Oct 2023.* *No comments received* As no comments received during wide circulation stage, it was decided to send documents Doc. ETD 19 (23933) for printing.
2	ETD/19/23935 IS 15382 : Part 3: 2019 (Identical To: IEC 60664-3:2016)	INSULATION COORDINATION FOR EQUIPMENT WITHIN LOW-VOLTAGE SYSTEMS Part 3: Use of Coating Potting or Molding for Protection against Pollution Second Revision	*The documents was wide circulated as vide email dated 23 Oct 2023.* *No comments received* As no comments received during wide circulation stage, it was decided to send documents Doc. ETD 19 (23935) for printing.
3	ETD/19/23936 IS/IEC 60071 : PART 2: 2018	INSULATION CO-ORDINATION Part 2: Application Guidelines Second Revision	*The documents was wide circulated as vide email dated 23 Oct 2023.* *No comments received* As no comments received during wide circulation stage, it was decided to send documents Doc. ETD 19 (23936) for printing.

ITEM 5 DRAFT INDIAN STANDARDS UNDER PRINTING

--- NIL----

ITEM 6 PROGRAMME OF WORK

6.1 The committee reviewed the information regarding the present position of work under ETD 19 as given in Annexure 2 , Annexure 3 of the agenda and following was decided:

a. The committee decided to revise IS/IEC/TS 61936-2 : 2015 Power installations exceeding 1 kV ac and 15 kV dc Part 2: dc inline with the latest IEC standard (IEC 61936-2:2023) and circulate the latest standard as P draft for a period of 1 month.

b. The committee reviewed the information present in Annex 3 of the agenda and it was decided to adopt /adapt IEC TS 61936-0:2023 -Power installations exceeding 1 kV AC and 1,5 kV DC - Part 0: Principles to be observed in the design and erection of high voltage installations - Safety of high voltage installations standard and circulate the standard as P draft for a period of 1 month.

ITEM 7 INTERNATIONAL ACTIVITIES

7.1 The Committee noted the information given in the agenda. The Chairperson advised that members actively participate in international standardization activities by nominating their experts to attend meetings of TC 42, IEC TC 99 and IEC TC 109. This would enable their experts to gain first-hand exposure to the discussions and represent the views of the Indian industry in IEC meetings.

7.2 The committee reviewed the representation of Experts from IN NC in various sub groups of IEC TC 42, IEC TC 99 and IEC TC 109 as given at Annexure-4 of the agenda and following was decided :

a. **Add Dr. R.K Jarial, National Institute of Technology, Hamirpur as member in WG-24/IEC TC 42**
b. **Add Dr. A. V. Giridhar, National Institute of Technology, Warangal as member in MT14/IEC TC 42.**
c. **Add Shri Abhishek Harsh , BSES Yamuna Power Limited, New Delhi as member in JWG 4/IEC TC 109.**

It was further decided that other members may send their cooption request for nomination in WG/MTs of the concerned IEC committees and the same will be discussed in the next meeting of committee .

ITEM 8 GUIDELINES FOR RESEARCH & DEVELOPMENT PROJECTS FOR FORMULATION AND REVIEW OF STANDARDS FOR INCLUSION OF EMPIRICAL DATA AND INSIGHTS .

Member Secretary provided a briefing to the members regarding the research and development project guidelines of BIS . Subsequently, the Chairman kindly requested the members to identify subjects for the R&D work in accordance with the guidelines and share the relevant information with BIS for further discussions.

ITEM 9 PROCESS REFORMS IN BIS

Process Reforms in Formulation of Standards

BIS has instituted several process reforms in respect of formulation of Indian Standards. It is essential that the members of Technical Committees are fully aware of these reform measures. The Agenda of the first meeting held during this financial year should be devoted to discussing these process reforms and developing a clear understanding of the roadmap for future.

The Agenda of these meetings should inter-alia include the following

a) Annual Action Plan for the year 2024-25

The Committee APPROVED the DRAFT Annual Action Plan for the year 2024-25 given at **Annexure-5 of** the agenda and requested Member Secretary to curculate the drafts identifed for review of members .

b) Annual Calendar of Technical Committee meetings

Annual Calendar of Technical Committee meeting for ETD 19 as approved by committee are mentioned below:.

Sectional Commiittee	**Q1**	**Q2**	**Q3**	**Q4**
ETD 19	**09-MAY-2024**	**-**	**08-October-2024**	**24-February-2025**

Item 11 ANY OTHER BUSINESS

There being no further business, the meeting ended with a vote of the thanks to the chair.

ANNEXURE-1

SI. No.	Organization	Member Name	Email
1	**In Individual Capacity**	Dr. Pradeep M Nirgude (*Chairperson*)	pmnirgude.cpri@gmail.com
2	**Bureau of Indian Standards**	Shri Ritwik Anand (*Member Secretary*)	eetd@bis.gov.in
3	**BSES Yamuna Power Limited, New Delhi**	Shri Abhishek Harsh	abhishek.harsh@relianceada.com
4	**Central Power Research Institute, Bengaluru**	Dr. K A Aravind	aravind@cpri.in
		Dr. Dharmesh Yelamanchi	dharmesh@cpri.in
5	**Electrical Research and Development Association, Vadodara**	Dr. Anil S Khopkar	anil.khopkar@erda.org
6	**GE T&D India Limited, Noida**	Ms.Elizabath Johnson	elizabeth.johnson3@ge.com
7	**GETCO, Vadodara**	Ms. Asha Agravatt	dedesign.getco@gmail.com
8	**Larsen and Toubro Limited, Mumbai**	Shri A. Kalyanasundaram	aksm@lntecc.com
		Shri Manivannan C	cmanivannan@lntecc.com
9	**National Hydroelectric Power Corporation, Faridabad**	Shri Braj kishore Singh	brajkishorsingh@nhpc.nic.in
10	**National Institute of Technology, Hamirpur**	Dr. R K Jarial	jarial@nith.ac.in
11	**National Institute of Technology, Warangal**	Dr. A. V. Giridhar	giridhar@nitw.ac.in
		Dr. D. V. S. S Siva Sarma	dvss@nitw.ac.in
12	**NTPC Limited, New Delhi**	Shri S.K. Lal	sklal@ntpc.co.in
		Shri Kura Ravi Kumar	kuraravikumar@ntpc.co.in
13	**Nuclear Power Corporation of India Limited, Mumbai**	Shri Robin Rana	robin.knit2009@gmail.com
14	**Siemens Limited, Mumbai**	Shri Nileshwer	nileshwer.ptd@siemens.com
15	**Tata Power Delhi Distribution Limited, New Delhi**	Shri Ankur Sangwan	ankur.s@tatapower-ddl.com
16	**TDK India Private Limited, Nashik**	Shri Sachin Gogate	sachin.gogate@tdk.com

ANNEXURE- 2

ETD19 : HIGH VOLTAGE ENGINEERING

Scope : To prepare standards for high voltage testing techniques and for different types of tests belonging there to such as high voltage ac, dc and impulse tests and high current impulse tests, definitions and basic principles of insulation coordination and insulation levels To prepare application guides recommending the insulation levels in relation to possibilities of over-voltage protection devices. The work also includes formulation of standards for clearances and creepage distances

Liaison:

IEC TC 99 - Insulation co-ordination and system engineering of high voltage electrical power installations above 1,0 kV AC and 1,5 kV DC- Principle (P)

IEC TC 42 - High-voltage and high-current test techniques - Principle (P)

IEC TC 109 - Insulation co-ordination for low-voltage equipment - Principle (P)

Published Standards

SI. No.	IS No.	Title	Latest IEC
1.	IS 15382 (Part 1) : 2022 60664-1:2020	Insulation Coordination for Equipment Within Low-Voltage Systems Part 1 Principles Requirements and Tests	**IEC 60664-1:2020**
2.	IS 15382 (Part 2/Sec 1) : 2014 IEC 60664-2-1 : 2011	Insulation coordination for equipment within low - Voltage systems: Part 2 application guide: Sec 1 explanation of the application of the IEC 60664 series, dimensioning examples and dielectric testing (First Revision)	**IEC TR 60664-2-1:2011**
3.	IS 15382 (Part 2/Sec 2) : 2018 IEC 60664-2-2 : 2002	Insulation Coordination for Equipment within Low-Voltage Systems Part 2 Interface Considerations Section 2 Application guide	
4.	IS 15382 (Part 3) : 2019 IEC60664-3 :2003	Insulation coordination for equipment within low-voltage systems : Part 3 use of coating potting or moulding for protection against pollution	**IEC 60664-3:2016 RLV**
5.	IS 15382 (Part 4) : 2017 IEC60664-4 :1997	Insulation Coordination for Equipment Within Low-voltage Systems Part 4 Consideration of High-frequency Voltage Stress (First Revision)	**IEC 60664-4:2005** The major changes made during the revision of IEC 60664-4 were the following: - inclusion of more recent information about the withstand characteristics of insulation at high-frequency voltage stress (see Annexes A, B and C); - inclusion of requirements for the dimensioning of clearances at high-frequency voltage stress (see Clause 4); - inclusion of requirements for the dimensioning of creepage distances at high-frequency voltage stress (see Clause 5); - inclusion of requirements for the

SI. No.	IS No.	Title	Latest IEC
			dimensioning of solid insulation at high-frequency voltage stress (see Clause 6); - inclusion of diagrams to provide guidance on dimensioning with respect to high-frequency voltage stress (see Annex F); specification of tests with respect to high-frequency voltage stress (see Clause 7); - inclusion of test circuits for high-frequency voltage withstand testing and partial discharge testing (see Annex D.1 and D.2.1); - inclusion of design criteria for partial discharge test circuits at high-frequency voltage (see Annex D.2.2); - inclusion of criteria for dealing with non sinusoidal voltage stress (see Clause 8 and Annex E).
6.	IS 15638 (Part 1) : 2023 IEC 61083 -1 : 2021	Instruments And Software Used For Measurements In High-Voltage And High-Current Tests Part 1: Requirements For Instruments For Impulse Tests First Revision	**Latest**
7.	IS 15638 (Part 2) : 2018 IEC 61083-2	Instruments and software used for measurement in high - Voltage and high current tests: Part 2 requirements for software for tests with impulse voltages and currents (First Revision)	**IEC 61083-2:2013**
8.	IS 15638 (Part 3) : 2022	Instruments And Software Used For Measurement In High-Voltage And High-Current Tests Part 3: Requirements for Hardware For Tests With Alternating And Direct Voltages and Currents	
9.	IS 16803 : 2018 IEC 62478 : 2016	High Voltage Test Techniques - Measurement of Partial Discharges by Electreomagnetic and Acoustic Methods	**IEC TS 62478:2016**
10.	IS 16826 : 2018 IEC 61180 : 2016	High - Voltage Test Techniques For Low-Voltage Equipment - Definitions, Test and Procedure Requirements, Test Equipment	**IEC 61180:2016**
11.	IS 16828 : 2018 IEC 62475 : 2010	High - Current Test Techniques - Definitions and Requirements for Test Currents and Measuring Systems	**IEC 62475:2010**
12.	IS 17341 : 2020 IEEE Std 1227™-1990	Guide for the Measurement of DC Electric-Field Strength and Ion Related Quantities	
13.	IS 1876 : 2005 IEC 60052	Voltage measurement by means of standard air gaps (First Revision)	**IEC 60052:2002**
14.	IS 2071 (Part 1) : 2016 IEC 60060-1 : 2010	High - Voltage test techniques: Part 1 general definitions and test requirements (Third Revision)	**IEC 60060-1 : 2010**

SI. No.	IS No.	Title	Latest IEC
~~15.~~	~~IS 2165 (Part 1) : 1977~~	~~Insulation co - Ordination: Part 1 phase to earth insulation co - Ordination, principles and rules (Second Revision)~~	
16.	IS/IEC 60060-2 : 2010	High - Voltage test techniques: Part 2 measuring systems	**IEC 60060-2:2010**
17.	IS/IEC 60060-3 : 2006	High - Voltage test techniques: Part 3 definitions and requirements for on - Site testing	**IEC 60060-3:2006**
18.	IS/IEC 60071-1 : 2019	Insulation Coordination Part 1: Definition Principles And Rules First Revision	**IEC 60071-1:2019 RLV**
~~19.~~	~~IS/IEC 60071-1 : 2006~~	~~Insulation co - Ordination: Part 1 definitions, principles and rules~~	
20.	IS/IEC 60071-2 : 2018	Insulation Coordination Part 2: Application Guide	**IEC 60071-2:2018**
21.	IS/IEC 60071-4 : 2004 IEC/TR 60071-4 : 2004	Insulation Coordination Part 4 Computational Guide to Insulation Co-ordination and Modeling of Electrical Networks	**IEC TR 60071-4:2004**
22.	IS/IEC 60269-3 : 2010 IEC 60269-3 : 2013	Low-Voltage Fuses Part 3 Supplementary Requirements for Fuses for Use by Unskilled Persons (Fuses Mainly for Household and Similar Applications) â€" Examples of Standardized Systems of Fuses A to F	
23.	IS/IEC 60270 : 2000	High - Voltage test techniques - Partial discharge measurements	**IEC 60270:2000+AMD1:2015CSV**
24.	IS/IEC 61786-1 : 2013	Measurement of DC Magnetic AC Magnetic and AC Electric Fields From 1 Hz to 100 kHz with Regard to Exposure of Human Beings Part 1: Requirements for measuring instruments	**New Publish**
25.	IS/IEC 61786-2 : 2014	Measurement of DC Magnetic AC Magnetic and AC Electric Fields From 1 Hz to 100 kHz with Regard to Exposure of Human Beings Part 2 : Basic standard for measurements	**New Publish**
26.	IS/IEC 61936-1 : 2021	Power installations exceeding 1 kV ac Part 1: Common Rules	
27.	IS/IEC/TS 61936-2 : 2015	Power installations exceeding 1 kV ac and 15 kV dc Part 2: dc	**IEC 61936-2:2023**
28.	IS/IEC/TS 62993 : 2017	Guidance for Determination of Clearances, Creepage Distances and Requirements for Solid Insulation for Equipment with a Rated Voltage above 1 000 V AC and 1 500 V DC, and up to 2 000 V AC and 3 000 V DC	
~~29.~~	~~IS 8690 : 1977~~	~~Application guide for measuring devices for high voltage testing~~	

ANNEXURE 3

IEC TC 42: Program of Work

SI. No.	Reference	Title
1	IEC 60052:2002	Voltage measurement by means of standard air gaps
2	IEC 60060:2024 SER	High-voltage test techniques - ALL PARTS
3	IEC 60060-1:2010	High-voltage test techniques - Part 1: General definitions and test requirements
4	IEC 60060-2:2010	High-voltage test techniques - Part 2: Measuring systems
5	IEC 60060-3:2006	High-voltage test techniques - Part 3: Definitions and requirements for on-site testing
6	IEC 60270:2000+AMD1:2015 CSV	High-voltage test techniques - Partial discharge measurements
7	IEC 61083-1:2021	Instruments and software used for measurements in high-voltage and high-current tests - Part 1: Requirements for instruments for impulse tests
8	IEC 61083-2:2013	Instruments and software used for measurement in high-voltage and high-current tests - Part 2: Requirements for software for tests with impulse voltages and currents
9	IEC 61083-3:2020	Instruments and software used for measurement in high-voltage and high-current tests - Part 3: Requirements for hardware for tests with alternating and direct voltages and currents
10	IEC 61180:2016	High-voltage test techniques for low-voltage equipment - Definitions, test and procedure requirements, test equipment
11	IEC 62475:2010	High-current test techniques - Definitions and requirements for test currents and measuring systems
12	IEC TS 62478:2016	High voltage test techniques - Measurement of partial discharges by electromagnetic and acoustic methods

IEC TC 99: Program of Work

SI. NO.	Reference	Title
1	IEC 60071:2024 SER	Insulation co-ordination - ALL PARTS
2	IEC 60071-1:2019	Insulation co-ordination - Part 1: Definitions, principles and rules
3	IEC 60071-2:2023	Insulation co-ordination - Part 2: Application guidelines
4	IEC TR 60071-4:2004	Insulation co-ordination - Part 4: Computational guide to insulation co-ordination and modelling of electrical networks
5	IEC 60071-11:2022/COR1:2023	Insulation co-ordination - Part 11 : Definitions, principles and rules for HVDC system

6	IEC 60071-12:2022	Insulation co-ordination - Part 12: Application guidelines for LCC HVDC converter stations
7	IEC TS 61936-0:2023	Power installations exceeding 1 kV AC and 1,5 kV DC - Part 0: Principles to be observed in the design and erection of high voltage installations - Safety of high voltage installations
8	IEC 61936-1:2021 CMV	Power installations exceeding 1 kV AC and 1,5 kV DC - Part 1: AC
9	IEC 61936-2:2023	Power installations exceeding 1 kV AC and 1,5 kV DC - Part 2: DC

IEC TC 109: Program of Work

SI. No.	Reference	Title
1	IEC 60664:2024 SER	Insulation coordination for equipment within low-voltage systems - ALL PARTS
2	IEC 60664-1:2020/COR1:2020	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests
3	IEC TR 60664-2-1:2011/COR1:2011	Insulation coordination for equipment within low-voltage systems - Part 2-1: Application guide - Explanation of the application of the IEC 60664 series, dimensioning examples and dielectric testing
4	IEC TR 60664-2-2:2002	Insulation coordination for equipment within low-voltage systems - Part 2-2: Interface considerations - Application guide
5	IEC 60664-3:2016	Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution
6	IEC 60664-4:2005	Insulation coordination for equipment within low-voltage systems - Part 4: Consideration of high-frequency voltage stress
7	IEC TS 62993:2017/COR1:2018	Guidance for determination of clearances, creepage distances and requirements for solid insulation for equipment with a rated voltage above 1 000 V AC and 1 500 V DC, and up to 2 000 V AC and 3 000 V DC
8	IEC TR 63040:2016/COR1:2019	Guidance on clearances and creepage distances in particular for distances equal to or less than 2 mm - Test results of research on influencing parameters

ANNEXURE 4

(Representation of IN NC experts in IEC TC 42, IEC TC 99 and IEC TC 106)

SI. No.	IEC Technical Committee	Subgroups	Subjects	Nominated Experts
1	**TC 42**	WG 20	IEC 61083-4: Instruments and software used for measurements in high-voltage and high-current tests? Part 4: Requirements for software for tests with alternating and direct currents and voltages	—
		WG 24	High-voltage test techniques - Dielectric loss measurements	—
		MT 03	IEC 60060-2, High voltage test techniques - Part 2: Measuring systems	—
		MT 4	IEC 60060-1, High voltage test techniques - Part 1: General definitions and test requirements	—
		MT 7	IEC 61083-2, Instruments and software used for measurements in high-voltage tests - Part 2: Requirements for software	—
		MT 12	IEC 62475, High current test techniques: Definitions and requirements for high current measurements	—
		MT 13	IEC 60060-3 - High-voltage test techniques - Part 3: Definitions and requirements for on-site testing	—
		MT 14	Maintenance of IEC 62478 - High-voltage test techniques: Measurement of partial discharge by electromagnetic and acoustic methods	—
		MT 15	Revision of IEC 60052: Recommendations for voltage measurement by means of sphere-gaps	—
		MT 16	Revision of IEC 61083-1: Instruments and software used for measurement in high-voltage impulse tests - Part 1: Requirements for instruments	—
		MT 18	Revision and update of IEC 61180: High-voltage test techniques for low voltage equipment	—
		MT 21	Maintenance of IEC 61083-3: Instruments and software used for measurements in high-voltage and high-current tests - Part 3: Requirements for instruments for tests with alternating and direct currents and voltages	—
		MT 23	Maintenance of IEC 60270: High-voltage test techniques: Partial discharge measurements	—
		JWG 22	Atmospheric and altitude correction linked to TC 115, SC 17A, SC 17C, TC 36, SC 121A, TC 37, SC 22F, TC 99	—
		AG 25	High-voltage and high-current test techniques – Advisory Group	—
2	**TC 99**	MT 4	Maintenance of IEC 61936-1	—
		MT 9	Maintenance of IEC 60071-2 (former TC 28/MT9)	—
		MT 10	Maintenance of IEC 60071-1 (former TC 28/MT10)	—

		MT 12	Principles to be observed in the design and erection of high voltage installations - Safety of high voltage installations	—
		MT 14	Maintenance of IEC TR 60071-4	—
		JWG 13	Insulation co-ordination for HVDC systems linked to TC 115	Mr Anil Khopkar Mr Palash Mishra Ms Anamika Rai
		TC 42/JWG 22	Atmospheric and altitude correction Managed by TC 42	—
		AG 11	Advisory Group on Strategy	—
		ahG 15	Establish a proposal for Group Safety Function	—
		ahG 16	Establish alignment of DC voltages in the range above 1,5 kV up to 100 kV	—
		JMT 7	Maintenance of IEC 61936-2 linked to TC 115, SC 22F	—
		JMT 10	Maintenance team for IEC 62477-2 Managed by TC 22	—
3	**TC 109**	MT 1	Principles, requirements and tests for clearances, creepage distances and solid insulation	—
		MT 2	Coating, potting or moulding for protection against pollution	—
		MT 3	High-frequency voltage stress with respect to insulation coordination of equipment within low-voltage systems	—
		JWG 4	Insulation coordination for equipment within a voltage range between 1 000 V and 2 000 V A.C. or between 1 500 V and 3 000 V D.C.	—

Annexure – 5
Draft Annual Action Plan -2024-25

➢ New Standard

1) IEC 61936-0:2023 Power installations exceeding 1 kV AC and 1.5 kV DC - Part 0: Principles to be observed in the design and erection of high voltage installations - Safety of high voltage installations.

2) IEC TS 63579 ED1- Atmospheric and altitude correction. (Draft under preparation – TC 42)

3) PNW 42-428 ED1- Instruments and software used for measurements in high-voltage and high-current tests - Part 4: Requirements for software for tests with alternating and direct currents and voltages. (Draft under preparation – TC 42)

4) IEC 62110:2009 - Electric and magnetic field levels generated by AC power systems - Measurement procedures with regard to public exposure.

➢ Revision

1) **IS 15382: Part 1: 2022** - Insulation Coordination for Equipment Within Low-Voltage Systems Part 1 Principles Requirements and Tests.

2) **IS 15382 : Part 2 : Sec 1 : 2014** - Insulation coordination for equipment within low - Voltage systems: Part 2 application guide: Sec 1 explanation of the application of the IEC 60664 series, dimensioning examples and dielectric testing (*First Revision*).

3) **IS/IEC 60060: Part 3: 2006** - High - Voltage test techniques: Part 3 definitions and requirements for on - Site testing.

4) **IS/IEC 60071: Part 4: 2004** - Insulation Coordination Part 4 Computational Guide to Insulation Co-ordination and Modeling of Electrical Networks.

5) **IS/IEC/TS 61936-2 : 2015** - Power installations exceeding 1 kV ac and 15 kV dc Part 2: dc
6) **IS 15382 (Part 4) : 2017** - Insulation Coordination for Equipment Within Low-voltage Systems Part 4 Consideration of High-frequency Voltage Stress (First Revision)

ANNEXURE -6

GUIDELINES FOR RESEARCH & DEVELOPMENT PROJECTS FOR FORMULATION AND REVIEW OF STANDARDS

1 INTRODUCTION

Bureau of Indian Standards (BIS), as the National Standards Body of India is responsible for formulating Indian Standards for products, processes and services. In the pursuit of this endeavour, it has so far developed more than 22000 Indian Standards. Action Research and Research & Development Projects have always been part of the standardization process. However, there has been a growing realisation in the context of the increasing diversification, innovation and complexities in the manufacturing sector and evolution of services and also due to the fast pace of changes in the manufacturing and services landscapes, research & development projects have to be made an integral part of the standardization process. The idea is that in principle no standard should be developed without intensive and insightful research work, which is not confined only to the review of the existing literature and focus group discussions on the subject chosen for standardization, but also covers the detailed field level study of the existing processes and practices in product manufacturing and service delivery. This requires a large network of domain area experts to carry out the research & development work. The existing network encompasses only a small segment of experts, who are either associated with technical committees as members or belong to some R&D organizations. The Memorandum of Understanding with the premier educational institutions imparting technical and professional education opens the window to the opportunities to expand this network substantially by utilizing the intellectual capital that resides with the faculty and the research scholars in these institutions. This association is conceived not only as a way to promote research & development work necessary for standards formulation but also to enrich the research ecosystem in these educational institutions.

2 OBJECTIVES

Objectives of this Scheme are to:

2.1 support and commission research & development projects to generate knowledge, empirical data and insights that would help in formulating new standards and updating & upgrading the existing Indian standards;

2.2 expand the network of domain area experts to carryout research & development projects in the areas related to standardization and conformity assessment; and

2.3 enrich the research ecosystem in the educational institutions imparting technical and professional education.

3 RESEARCH & DEVELOPMENT PROJECTS

3.1 Research & development projects under these guidelines are described as follows:

A project aimed at comprehensive, in depth and incisive study of a product, process or service or all taken together in respect of a subject under standardization, encompassing literature review, analysis of the data from secondary sources, collection and analysis of data from primary sources and stakeholder consultations.

3.2 The duration of a project shall not exceed six months counted from the date of the award of the project to acceptance of the final report by the Sectional Committee concerned, provided that the Sectional Committee must not take more than one month to give its decision on the final report. Further provided that the time taken by the Sectional Committee for giving its decision shall not be counted. The Sectional Committee may extend the duration but for not more than 2 months in special circumstances, the reasons for which shall be recorded in the minutes of meeting of the Sectional Committee.

3.3 The upper limit for expenditure for a project shall be Rs 10 lakhs (including taxes) only.

3.4 BIS will publish a list of research & development projects along with Terms of Reference (ToR) on Standardization portal or any other suitable digital platform.

3.5 If any organization or an expert on behalf of an institute wants to propose a research & development project on any new and emerging area in which they have expertise, they can do so through the same platform for the consideration of the Sectional Committee.

4 TERMS OF REFERENCE (ToR)

4.1 The ToR of Research& development project shall be prepared by the Sectional Committee concerned, and shall contain:

a) Title, background and objectives of the study;
b) Expected research methodology (brief information, for example, survey, testing, industry visits, etc.);
c) Scope of study;
d) Outline of the tasks and final deliverables expected from the Proposers;
e) Methods of review, schedule for submitting the 1st draft report and project completion report;
f) Any support or inputs to be provided to the Proposer; and
g) Maximum duration of project and timelines for submission of proposal.

4.2 While preparing the Terms of Reference (ToR) the sectional committee may consider the following points as a research & development project may include one or mix of the following:

a) Secondary research based on internet or published information including authentic data sources;
b) Survey based research (including industry visits) to ascertain prevailing market conditions and practices, standards in use, industry and consumer preferences, availability of infrastructure, technical capabilities, comparative trends, economic trends;
c) Ascertaining compliance to existing and proposed standards through testing, review of past test reports, other validation and verification checks; and
d) Basic and innovative research to establish normative criteria. Criteria may include performance, health, safety, environmental impact.

5 APPROVAL OF COMISSIONING OF THE RESEARCH AND DEVELOPMENT PROJECTS

5.1 There shall be a Review Committee for approving the projects recommended by the Sectional Committee. The composition of Review Committee shall be as follows:

DDG (SCMD)	: Chairperson
DDG (Standardization) concerned	: Member
DDG (Certification)	: Member
DDG (Labs)	: Member
Officer in-charge for research works in SCMD	: Member Secretary

5.2 The Head of Technical Department concerned and Member Secretary of the Sectional Committee shall apprise the review committee about the project and explain the rationale behind the proposed research & development project.

6 ELIGIBILITY CRITERIA

6.1 The following shall be eligible for carrying out research & development projects under the Scheme:

a) Academic institutions & universities having MoU with BIS and faculties and research scholars thereof;
b) Member(s) of Technical Committees of BIS.

6.2 Faculties and research scholars shall submit proposals through their institute. Members of technical committees belonging to any association/organization shall submit the proposals through their association/organization. Members of technical committees in personal capacity can submit their proposals directly to BIS, however if carrying out a research & development project requires collaboration with any institution/organization, concurrence of the same shall also be submitted.

7 PROCEDURE FOR APPLICATION

7.1 Submission of Proposal

7.1.1 Applications for undertaking research & development projects shall be submitted in the manner prescribed by the Bureau and within the prescribed timelines,

7.1.2 Proposer(s) shall submit their proposal in a "single stage - two envelope bid system" consisting of separately sealed "Technical and Financial proposals". The Technical Proposal shall be submitted as per format prescribed in **Annex A** and the Financial Proposal shall be submitted in the format prescribed as per **Annex B**, clearly specifying expected expenditure against each element such as manpower, equipment (shall not include computer hardware and software), travelling, testing, consumables, stationery, overheads, etc.

7.1.3 There shall be maximum one proposal from one institute on a given subject.

7.1.4 No contractual obligation whatsoever shall arise until a formal agreement is signed and executed between the Bureau and the Proposer.

7.2 The proposals shall inter-alia consist of the following:

7.2.1 In respect of the research & development projects put up by the Bureau:

a) Details of the Project team along with the organization/institution associated with;
b) The CV of the Project leader and expert/expert(s) to be associated with the project and a letter from organization authorizing Project Leader and expert/expert(s) to undertake the research as proposed.
c) A write up on the understanding of the scope and objectives of the project.
d) Methodology (sampling size, if applicable) to be adopted for the proposed study with a clear road map and time plan for completion of the project;
e) Stage wise timelines for completion of the project.

7.2.2 In respect of research & development projects proposed by any expert/organization:

a) Details of the Project team along with the organization/institution associated with;
b) The CV of the Project leader and expert/expert(s) to be associated with the projects and a letter from organization authorizing Project Leader and expert/expert(s) to undertake the study as proposed.
c) Objective that will be achieved and scope of the project clearly highlighting the need of such study and what would be the final deliverable;
d) Methodology (sampling size if applicable) to be adopted for the proposed study with a clear road map and time plan for completion of the project;
e) Details of infrastructure facilities available for the project, in the institution and additional facilities required (if any) for carrying out research.

f) Stage wise timelines for the completion of the project

7.3 The Head of the concerned institution while forwarding the application and nominating the project leader shall certify that:

a) the core facilities (land, buildings, laboratory, manpower and other infrastructure etc.) are available and will be provided to the Project Leader to work on the proposed project,
b) the organization will discharge all its obligations, particularly in respect of management of the financial assistance given, and
c) no other funding is being received/sought for the project proposed to be sanctioned by BIS.

8 PROCEDURE FOR APPROVAL WITHIN BIS

8.1 There shall be a Research Evaluation Committee (REC) to evaluate the proposals received, the composition of which shall be as follows:

DDG (PRT) : Chairperson
Head (CMD) concerned : Member
Head (LPPD) : Member
Head of the Technical Department concerned : Member
Director Finance : Member
Two Experts from the Sectional Committee concerned : Members
Head (SCMD) : Member Secretary

*The experts shall be nominated by the Sectional Committee and the nominated members shall give a declaration to the effect that there is no conflict of interest with respect to the project.

8.2 The evaluation and selection will be as per Quality and Cost Based Selection (QCBS) method (Rule 192, GFR 2017) which is explained in **Annex C**.

8.3 The criteria for evaluation of technical proposal shall be as under:

Sl No.	**Criteria**	**Max. Marks**	**Score by REC**
1	Profile of key individual/individuals to be associated with the research project	**10**	
2	Experience of the individual/organisation in conducting research projects in the relevant discipline	**20**	
3	Understanding of Scope, Objectives and deliverables	**15**	
4	Methodology	**30**	
5	Work plan/Execution strategy	**15**	
6	Chapterisation, contents and lay out of the proposed report	**10**	
	TOTAL	**100**	

Note: REC may call for a presentation by the proposers if deemed necessary.

8.4 The minimum qualifying marks shall be 70. All the proposals with marks below 70 shall be considered rejected.

8.5 REC may refer back, advise changes for reconsideration or reject any proposal.

8.6 REC shall open the financial proposals (bids) within 7 days from completion of technical evaluation.

8.7 A final score sheet of all the proposers shall be made as detailed in **Annex C** and the proposer getting the highest combined score shall be selected for awarding the project.

8.8 The member secretary (REC) shall send the selected proposals to DG/DDG Standardization concerned, as per their delegated powers, for consideration and approval for sanction of the project.

8.9 After the approval of project, the member secretary (REC) shall inform the concerned technical department and the proposer regarding the decision.

8.10 After the sanction of fund is approved, the draft agreement (prepared in line with model agreement given at **Annex D**, to be modified on case-to-case basis) shall also be prepared by the Member Secretary (Sectional Committee), clearly highlighting the payment term. The Head (Technical Department) shall sign the agreement on behalf of BIS in all cases.

8.11 In case the proposer to whom the project is awarded declines to take up the project, the Research project shall be awarded to the proposer getting the next highest combined score among the qualified proposers.

9 SIGNING OF AGREEMENT AND ISSUING OF SANCTION LETTER

9.1 After receipt of duly signed agreement from the proposer and after the receipt of the approval of competent authority, a sanction letter shall be issued by the concerned Head (Technical Department) to the organization/individual member. The project would be considered to have commenced from the date the sanction letter is issued.

10 FUNDING

10.1 The mode of payment for Research & development projects shall be as follows:

a) First instalment up to a maximum of 30 percent of the total approved project cost would be released after approval of the project.
b) Second instalment to the extent of 50 percent of the approved estimated cost would be released on the submission of progress report along with the report on utilization of the 75 percent of the fund and acceptance of the same by the Sectional Committee.

c) The balance amount shall be released after submission of the final project report along with utilization certificate for the fund released and its acceptance by the Sectional Committee.

10.2 Release of each instalment is subject to satisfactory progress, required stage - wise deliverables and submission of the Utilization Certificate (UC) as per Form GFR12-A of GFR 2017 along with the statement of expenditure (SoE) issued by the Competent Authority.

11 PROGRESS REPORT AND MONITORING OF PROJECT

11.1 The relevant Sectional Committees of BIS will monitor the progress of project to ensure that the project is progressing as per the planned arrangement. However, member secretary of the concerned Sectional Committee under overall coordination of HoD would be the controlling/link officer for Research & Development projects and would constantly monitor the progress of the project every 30-45 days. Any delay in implementation of project should be duly justified by the Project leader and shall be put up to Research Evaluation Committee (REC) for approval.

11.2 The Sectional Committee shall review and give its acceptance of the progress reports submitted, within 3 weeks.

12 SUBMISSION OF FINAL PROJECT REPORT (FPR)

12.1 The FPR must be detailed and should include information about:

a) the original objective(s) of the project,
b) how far these objective(s) have been achieved, and
c) how the results will benefit the development of the national standard(s) and
d) a copy of final working draft of the concerned standard(s) (wherever applicable)
e) include clear inferences, recommendations regarding their use in the proposed standards,
f) all references used, raw data of surveys, sampling, testing and experiments,
g) undertaking that all the information presented is authentic.

12.2 FPR received in BIS would be put up to the concerned Sectional Committee, which will take necessary action for preparation/revision of standard appropriately. The Project leader shall assist in the disposal of comments received on the research project, draft standard and for the preparation of the finalized draft, as may be desired by the Sectional Committee.

12.3 The proposer shall submit the Project Completion Report (PCR), within one month of completion of project along with the Utilization Certificate of the fund released as per Form GFR 12-A of GFR 2017 and the statement of expenditure (issued by the Competent Authority -in case of Govt. organization / Charted Accountant in case of private organization).

13 RESULTS OF RESEARCH & DEVELOPMENT

13.1 Project Leader(s) would be encouraged to publish the results of research & development. While doing so, acknowledgement to the effect that financial assistance was received from BIS should be made in the research paper(s) published. BIS should be acknowledged in similar type of other published work/press reports.

13.2 One re-print of each research paper(s) published as a result of the work done under the BIS funds shall be sent to BIS as and when published.

14 INTELLECTUAL PROPERTY RIGHTS

14.1 Ownership of any intellectual property, including but not limited to confidential information, know-how, patents, copyrights, design rights, rights relating to computer software, and any other industrial or intellectual property rights, developed solely by Proposer shall be vested with that Party.

14.2 Ownership of any intellectual property, including but not limited to confidential information, know-how, patents, copyrights, design rights, rights relating to computer software, and any other industrial or intellectual property rights, developed solely by the Bureau shall be vested with that Party.

14.3 The Intellectual Property arising out as an outcome of research project undertaken under these guidelines shall be vested with Bureau.

15 OPERATION OF FUNDS

15.1 The utilization certificate of the funds received in previous instalment (if any) to BIS should be annexed with the Statement of all equipment, books, etc purchased out of the funds certified by the Head of the organization. The name, description of the equipment, cost in rupees, date of purchase, and the name of the supplier to be given in the list. The main purpose/function of the equipment may also be mentioned against each item.

15.2 Any unspent balance lying with the organization should be refunded to BIS after the finalization of the draft immediately, by means of demand draft or online transfer.

15.3 The Head of the concerned standardization department of BIS shall ensure that the project leader submits the utilization certificate in the manner prescribed in Form GFR 12-A of GFR 2017.

15.4 Head of the Standardization department shall also ensure that the operation of funds is monitored strictly as specified in **Annex E**. Further the Project Leader is also fully aware and shall adhere to the obligations of his/her as given in this procedure.

16 OTHER REQUIREMENTS

16.1 Organizations receiving financial assistance for research & development projects from BIS would have to maintain separate accounts for each research project.

16.2 In the event of a Project Leader's absence from his normal place of duty for two months at a stretch, the Head of the organization would need to immediately nominate an Alternate Project Leader(s) to supervise the implementation of the project and such a name has to be approved in advance by BIS. In any event, a Project Leader shall give prior notice to BIS of his intention to stay away from the project.

16.3 Items of equipment, etc should be purchased on the basis of the established rules and procedures of the entity/organization.

16.4 Stock register of all equipment, books, etc purchased out of the funds shall be maintained.

16.5 Any capital-intensive equipment/devices purchased using financial assistance from BIS for research & development projects shall be allowed to be retained by the proposer for their research activity etc.

16.6 The organization shall have to ensure that expenditure with respect to TA/DA are made only as per their own norms but under no circumstances the executive/business class air travel or stay in a five-star hotel is made. The overhead expenses should not be more than 20 percent of the cost of the project.

16.7 The Project Leader must ensure that the concerned organization's newsletter would carry information on the activities and accomplishments of the various projects funded by the BIS.

16 TERMINATION OF PROJECT:

The research & development project can be terminated in case of any of the following:

a) the approval of research & development project may be treated as withdrawn, if the sanctioned research & development project does not commence within one month from the date of receipt of the sanction letter, unless otherwise authorized by BIS;
b) A Proposer may request for the withdrawal of a research & development project even after commencement of the project. In such case the entire fund given till that date shall be refunded to the Bureau; and
c) if the Proposer fails to submit Progress report/Completed Project report within the prescribed timelines.

The REC shall take decision on all cases of termination.

18 RESOLUTION OF DISPUTES

Dispute Resolution: In case of any dispute that cannot be resolved amicably, it shall be referred to Sole Arbitrator appointed by the Director General of the Bureau of Indian standards, whose decision shall be final and binding upon both the parties. The provisions of the Arbitration and Conciliation Act, 1996, as amended from time to time, shall be applicable.

ANNEX A

TECHNICAL PROPOSAL

1. Name of the Proposer and Organization	
2. Project title	

3. Project leader

a) Title: Prof/Dr/Mr/Ms b) Name:		Sex M/F
c) Full official address		
Mobile/Telephone Fax E-mail		
d) Designation		
e) Date of birth		
f) Academic qualifications along with year of completion		
g) Experience		

4. Other members of the research team (give name, address, experience and academic qualifications for each member)

1. Name	Designation: Address: Experience: Academic Qualifications:
1. Name	Designation: Address: Experience: Academic Qualifications:

5. Research support availed/being availed/applied for by the Project leader from different sources, including BIS, during the last 5 years:

Funding agency	Title of the project and reference number	Duration (from mm/yyyy to mm/yyyy)	Percentage of time devoted /being devoted/to be devoted, in man months	Amount in lakh Rs.

6. Details of facilities available with the institute/organization w.r.t. the research & development project

Facilities	Relevance to project
1.	

7. Aims and significance of the project
(Include the current status of work in area, both in India and abroad, with appropriate reference list at the end; identify lacunae, define question to be investigated; list briefly specific objectives of investigation. ethical clearance be enclosed where necessary).

8. The CV of the Project leader and expert/expert(s) to be associated with the projects and a letter from organization authorizing Project leader and expert/expert(s) to undertake the study as proposed.

9. Objective that will be achieved and scope of the project clearly highlighting the need of such study and what would be the final deliverable.

10. Methodology (sampling size if applicable) to be adopted for the proposed study.
11. Road map (Stage wise timelines for the completion of the project) and time table for completion of the project
12. Plan of work, methods and techniques to be used.
13. List of awards and honours conferred on the Project leader with dates.
14. Deliverables
15. Declaration and attestation:

I certify that all the details declared here are correct and complete. Signature of Project leader	Date:

12. Certificate of the institution:

This is to certify that a) we have read the terms and conditions of the BIS Research & Development Guidelines necessary for the compliance of the same. b) the necessary institutional facilities are available and will be provided for the implementation of this research proposal being submitted to the BIS for funding. c) Full account of expenditure will be rendered by the institution.
Name of the head: of the institution Signature with date: Seal:

ANNEX B
FINANCIAL PROPOSAL FORMAT
[To be submitted on letterhead wherever applicable]

To:
Bureau of Indian Standards
Manak Bhavan, 9 Bahadur Shah Zafar Marg
New Delhi – 110002, India

Sub: Financial Proposal for Research & development Project on (Title: _____)
for Bureau of Indian Standards (Research guidelines document no._____dated----------2023).

Dear Sir,

We are pleased to submit our Financial Proposal for Research & Development Project on (Title: _____) for Bureau of Indian Standards as per the terms and conditions of the Research & Development guidelines document (Ref No.: _____dated: ___-___-2023).

1. We hereby declare that our financial proposal is unconditional in all respects.
2. Our financial proposal is as follows:

3. Cost of the Project:

Sl no.	Budget items	Amount
1	Manpower cost	
2	Consumables [Chemicals, samples, testing glassware, stationery, books etc, information search (from databases)]	
3	Equipment	
4	Travel	
5	Any other/Overhead expenses	
	Total project cost	

*Please write NA in case any item is not applicable
a) The prices should be quoted in Indian Rupees above by the proposer.
b) The quoted price should be inclusive of all applicable taxes and charges.
c) Fund shall be released after deducting TDS as per applicable provisions of GST and income tax.
d) Justification of cost (for each item of equipment, consumables and travel. Quotation(s) for equipment should also be enclosed).

Yours faithfully,
Date: (Signature of the Project leader)
Place: (Name and Designation of the proposer)
Name and Signature of the head of the institution
(Rubber seal of the proposer/institution/organization, as applicable)

ANNEX C

Stage 1: Evaluation of Technical Proposal:

a) The proposal will be evaluated against the criteria defined at clause 8 in these Guidelines. The proposer may be required to provide additional details as deemed necessary by the REC.

b) Upon technical evaluation of each proposal, "Technical marks" out of 100 marks will be assigned to every proposal.

c) The proposals with score 70 or more marks in technical evaluation, will qualify for the evaluation of the financial proposal.

d) The proposer with the highest marks in technical proposal will be awarded 100 "Technical Score" and subsequently other proposers will also be awarded "Technical Score" relative to the highest technical marks for the final composite score calculation purpose e.g., if the highest technical marks is 90 then "Technical Score" is (90/90) × 100 = 100, hence the proposer with highest technical marks will score 100"Technical Score". Similarly, another proposer who scored 80 marks, will get (80/90)x 100 = 88.88 "Technical Score". Following formula will be used for the "Technical Score" (TS) calculation:

$$\text{Technical Score (TS)} = \left[\frac{\text{Proposer's Technical Marks}}{\text{Highest Technical Marks}}\right] \text{X } 100$$

e) The details of technical evaluation parameters are provided at clause 9.

Stage-2 Evaluation of Financial Proposal

a) The evaluation will be carried out if financial proposals are complete and computationally correct.

b) Upon financial evaluation of each proposal, the lowest financial proposal will be awarded 100 "Financial score". The "Financial Score" of other proposer(s) will be computed by measuring the financial proposal against the lowest financial proposal. Following formula will be used for calculating "Financial Score":

$$\text{Financial Score (FS)} = \left[\frac{\text{Lowest Financial proposal}}{\text{Proposer's Financial Proposal}}\right] \text{X } 100$$

Stage-3 Computation of Combined Score

The "Combines Score" is a weighted average of the Technical and Financial Scores. The ratio of Technical and Financial Scores is 70:30 respectively. The Combined Score will be derived using the following formula:

$$\text{Combined Score} = [(\text{TS} \times 0.70) + (\text{FS} \times 0.30)]$$

The responsive proposers(s) will be ranked in descending order according to the Combined Score, which is calculated based on the above formula. The highest-ranking proposer asper the Combined Score will be selected for award of Research Project.

ANNEX D

MODEL AGREEMENT

(To be modified on case-to-case basis)

This Deed of Agreement made this _____day of _____(Month & Year) between Bureau of Indian Standards having Head Office at Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi – 110 002 (hereinafter called 'BIS', which expression shall, wherever the context so admits, includes its successors and assigns) on one part and (name of the organization/expert) (hereinafter called _____which expression shall, wherever the context so admits, include their heirs, executors, administrators, legal representative and assigns) of the other part, witness as follows:

1. Whereas (name of the organization/expert) through (name of the Project Leader) has submitted a proposal to BIS pertaining to Research & development project titled _____for consideration and BIS has accepted the proposal.

2. That duration of the Research & development project shall be ___months with periodic and final reviews. The total cost of the project shall be Rs_____/- (Rupees in words) for the complete project. No further expenditure shall be borne by BIS on any account of this project including escalation of time.

3. The fund would be utilised for the specific project/assignment as approved by BIS and shall be spent within the specified time. Any portion of the fund which is ultimately not required for expenditure for the approved purpose shall be duly surrendered to BIS.

4. (Name of the organization/expert) shall not entrust the implementation of the project/assignment approved by BIS for which fund has been received to any other institution/expert or to divert the fund received from BIS as assistance to any other institution/expert/proposer.

5. (Name of the organization/expert) indemnifies BIS from any legal and/or financial encumbrance arising out of any infringement of IPR/licensing of IPR/technology transfer/commercialization.

6. (Name of the organization/expert) shall maintain an audited record in the form of a register for permanent, semi-permanent assets acquired solely or mainly out of BIS fund. Once the Research & development project is completed satisfactorily, the organization taking up the Research project may retain the equipment/devices for their Research & development activities, etc. The equipment procured through BIS fund should bear a label "BIS Funded".

7. BIS shall release the funds for the project as follows:

a) First instalment up to a maximum of 30 percent of the total approved project cost would be released after approval of the project.

b) Second instalment to the extent of 50 percent of the approved estimated cost would be released on the submission of progress report along with the report on utilization of the 75 percent of the fund and acceptance of the same by the Sectional Committee.
c) The balance amount shall be released after submission of the final project report along with utilization certificate for the fund released and its acceptance by the Sectional Committee.

8. The completion of the Research & development project shall remain the responsibility of (name of the organization/expert) even if the project leader is not available due to any reason whatsoever. After completion of the project, a Project Completion Report giving details (objective(s) achieved, raw data of surveys, sampling, testing and experiments) of shall be submitted by the Project leader the original objective(s) of the project,

9. (Name of the organization/expert) shall ensure the completion of the project under the guidance and supervision of any other faculty/researcher, if the nominated project leader would not be available due to any reason. Such a faculty member/researcher can only be nominated with the approval of BIS.

10. In case (name of the organization/expert) is unable to complete the project to the satisfaction of BIS in stipulated time or extended time and leads to termination of the research project, BIS shall be entitled to claim the refund of fund so sanctioned with interest @ 10 percent thereon from (name of the organization/expert).

11. The authority to extend the duration of the project shall rest with BIS.

12. BIS shall have the right to formulate monitoring methodology of the Research & development project.

13. Dispute Resolution: In case of any dispute that cannot be resolved amicably, it shall be referred to Sole Arbitrator appointed by the Director General of the Bureau of Indian standards, whose decision shall be final and binding upon both the parties. The provisions of the Arbitration and Conciliation Act, 1996, as amended from time to time, shall be applicable.

14. Undertaking given by project leader, if any, shall be part of the agreement.

15. (Name of the organization/expert) shall be responsible for discharge of all its obligations of the project through the nominated project leader or any other expert/expert(s) in case of necessity particularly in respect of management of financial assistance given to them. (Name of the organization/expert) shall refund any excess/unutilized amount of the fund to BIS.

16. Release of subsequent instalments is subject to satisfactory progress, required stage - wise deliverables and submission of the Utilization Certificate (UC) as per Form GFR12-A of GFR 2017 along with the statement of expenditure (SoE) issued by the Competent Authority.

17. (Name of the organization/expert) shall ensure that Project leader shall give presentation on the progress of project to BIS as and when directed by BIS for continuation of the project,

and shall assist in the disposal of comments received related to the Research & development Project.

18. The project shall be deemed to have been commenced from the date of release of sanction letter.

19. (Name of the organization/expert) shall ensure that while publishing the results of research & development, acknowledgement to the effect that financial assistance so received from BIS be made in the research papers published/ other published work/ press reports.

20. Procedure for screening/evaluation, selecting, monitoring Research & development projects prescribed in "Guidelines for Research & Development Projects for Formulation and Review of Standards' shall be part of the agreement.

ANNEX E

OPERATION OF FUNDS AND PROGRESS REPORT

1. Title of the Project:	Project number:
2. Name & Address of Project leader:	Date of Commencement: dd/mm/yyyy

3. Details of Equipment Purchased (if any):

Name of equipment	Cost	Supplier	Date of purchase/ placing order for each item of equipment
NOTE - The equipment fund once fixed cannot be enhanced. Project leaders are advised to give authenticated estimates of the cost of equipment. Equipment should invariably be purchased within 1 month from the date of receipt of the fund and/or sanction letter.			

4. Fund received_____.
5. Expenditure made in Rupees: (Please provide the details)

Expenditure	Amount	Taxes (as applicable)	Total
Manpower cost			
Consumables			
Equipment			
Travel			
Others			
Grand Total			

6. Amount saved (if any) from the last instalment: Rs_____.

7. Date on which scheme will complete its normal tenure of months _____.

8. Whether extension beyond normal tenure has been requested. Yes /No.

If yes, justification for extension and programme of work to be completed. Also mention as to why the work could not be completed as per the original plan.

{Extension beyond normal tenure should be requested at the Project Monitoring Session before end of tenure (as given in ToR)}.

9. Constraints (if any) faced in the progress of work and suggestions to overcome them.

10. Any deviation from original plan with its nature and cause.

11. List of publication giving full bibliographic details accrued from this project (copies of the paper (s) should be enclosed).

12. Summary of work done (200 words).

13. Proposed programme of work for the next month (1000 words).

14. Detailed Progress Report enlisting the objectives in beginning briefly (up to five pages maximum).

Signature of Project leader
Date:

Note: No column should be left blank; write not applicable (NA), wherever applicable.

TEMPLATE FOR THE TERMS OF REFERENCE FOR THE R&D PROJECTS

(*Refer to the Guidelines on R&D Projects issued vide note SCMD/R&D dated xx-09-23*)

1. **Title of the Project**: Mention the title of the project.

2. **Background:**
   a) Mention the Technical Committee and Division Council the project is related to;
   b) Mention the standard / document no. for the standard under development or review to which the project is related to;
   c) Briefly explain the rationale for the commissioning of the project.

3. **Scope**: Mention the scope of the project.

4. **Expected Deliverables**: Mention the outcome of the project.

5. **Research Methodology**:
   Mention the essential components of the methodology like mid-term review, focus group discussions, visits to the manufacturing units and/or laboratories, collection and testing of samples etc. with the details of the sample size for them as applicable.

6. **Requirement for the CVs:**
   Mention the requirement for the CVs of the persons to be engaged for the project.

7. **Timeline and Method of Progress Review:**
   Suggest the stagewise timelines including that for the submission of the first draft, final draft and the report and the mechanism for the review of the progress.

8. **Support BIS will Provide:**
   Indicate the support BIS may provide in terms of the standards, other publications, information regarding manufacturers and labs etc.

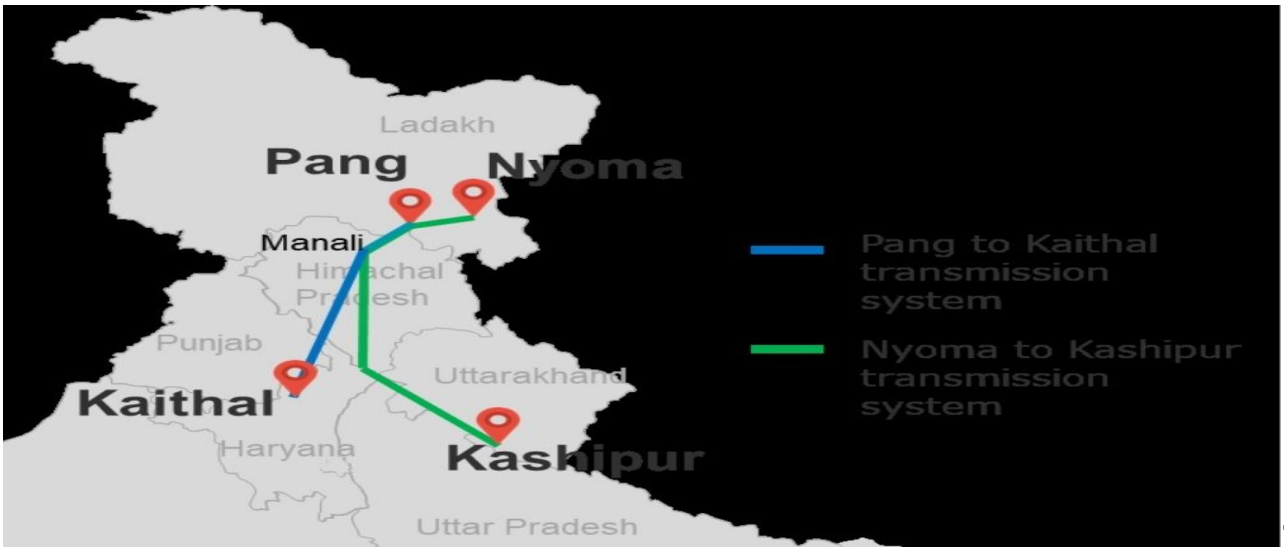
Annexure -7

DRAFT TEMPLATE FOR THE TERMS OF REFERENCE FOR THE R&D PROJECTS
(*Refer to the Guidelines on R&D Projects issued vide note SCMD/R&D dated xx-09-23*)

1. **Title of the Project**: Atmospheric and altitude correction in Standards related to high voltage testing (IS / IEC 60071 series and IS/IEC 60076 series) .

2. **Background:**

Government of India has announced an ultra-mega renewable generation project at LEH District of Ladakh Union territory. First phase of the Project consists of 9GW of Solar, 4GW of Wind and 11GWh of BESS at Pang region in LEH. The Power thus generated is planned to be evacuated by 5000MW HVDC Transmission system from Pang to Kaithal district in Haryana.



The Altitude of the Pang site goes up to 4800m above MSL, which poses significant technical challenge. So far, no HVDC project exists at such high altitude worldwide. This project attains very high significance for India from the point of view of achieving carbon neutrality and strategic location of the project.
In addition to the project at Pang, government has plan to have additional RE generation and 5000MW HVDC for evacuation at Nyoma Region of LEH.

Considering the importance of the project for our nation, it is proposed to conduct an R&D project to determine the criteria for dielectric design and testing of equipment to make them suitable for high altitude of 5000m above msl. The success of the study is expected to significantly De-risk the project from technical viewpoint and hence increase the feasibility of the project.

3. **Scope**: Scope of this research project includes –

1. To Define clear criteria for derating of the external AC/DC insulation (e.g., test voltages, creepage distances etc.)

2. Define the most appropriate dielectric testing methodology for HV and LV equipment to be installed at high altitude.

3. Alternative mitigations for equipment where derating of external insulations is not feasible, e.g., high pressurized enclosures.

4. To define the criteria for higher failure probability of IGBT devices due to increased cosmic radiation at high altitude.

5. Alternative mitigation measures to prevent higher failure on account of increased cosmic radiation e.g., shielded enclosure etc.

3. Expected Deliverables:

1. Literature review that may involve :

a. Study of the role and relevance of the proposed project vis-a-vis current scenario.
b. Analysis of technical specifications of already available on High Voltage Testing of Electrical equipments.
c. Available standards that may be relevant to High Voltage testing at high altitude.

2. A survey of important HVDC projects can also be carried out for understanding the experience at the user/ end and any critical parameters to be taken care of while formulating the standard.
4. Report shall be prepared of research findings and data collected as per the deliverables of this project.
5. Preparation of the draft document.
6. Submission of the final project document.

6. **Research Methodology**:

The RE Generation and HVDC terminal is planned to be located at approx. 4800m above MSL. Such high altitude is specific to Himalayan Region e.g., India. While the matter is of very high national interest, it has not gained so much momentum globally and hence there is limited interest in investing for research in the field of high altitude for HVDC projects. On review the existing international standards, following observations are made

- Currently standards provide Altitude correction factors for lesser height e.g. up to 4000m above msl.

- Different recommendations for Altitude correction provided in different standards e.g.
  a) IEC-60071 specifies Altitude Correction as

$$k_a = e^{m\left(\frac{H}{8150}\right)}$$

  b) IEC-60076-1 & -3 specifies Altitude Correction as a fixed percentage i.e. 1% increment for every 100m in excess of 1000m.

  Application of two above method results in significantly different results

- Clear recommendation for Creepage distance correction of AC and DC insulators are not available

It is therefore proposed that proposed research is taken up to determine the criteria for dielectric design and testing of equipment to make them suitable for high altitude.

Further as per literature higher failure rate/maloperation has been observed in IGBT devices at higher cosmic radiation level prevalent at high altitudes.
It is therefore proposed to investigate into this phenomena and come out with specific criteria and possible mitigation measures.

6. Criteria for Identification of Proposer to conduct Research work:

1. Proposer shall be a technologist with experience in testing of electrical equipments.

2. Proposer shall be a member of the Sectional Committee or the academic institution and universities having MoU with BIS.

Note: The acceptance of proposal is subjected to the approval of Sectional Committee and Screening Committee of BIS based on the BIS norms.

7. Timeline and Method of Progress Review:

The review will be carried out in each month along with consultation of other experts if required. The literature review after 1 month, the first draft after 4 months and the final draft along-with report at the end

of 6 months.

8. Support BIS will Provide:

- BIS will provide access to latest editions of standards, magazines, Research Journals etc required for the project .

- BIS will also provide details of manufacturers , labs, etc.