EMPANELMENT OF ON GRID / OFF GRID / HYBRID INVERTERS

(II Edition –February 2021)

(Guidelines and Application Form)

AGENCY FOR NEW AND RENEWABLE ENERGY AND RESEARCH TECHNOLOGY

ANERT
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Notice

Application for the Empanelment of On-Grid / Off-Grid/ Hybrid Inverters

ANERT invites direct applications from reputed manufactures of inverters for the empanelment process. The companies willing to apply for the process must submit a cover letter and attach the details as per the format along with the detailed datasheet of the product/products. Applications must be submitted online on or before 25/02/2021 along with the application fee.

Documents to be attached:

1. Cover letter for the submission on letterhead.
2. Manufacturer Registration certificate (Annexure-1)
3. Company profile (Restricted to 5 pages)
4. Application for the Empanelment of Inverters
5. GST Registration Certificate (Annexure-2)
6. Acknowledgement of online payment (Annexure 3)
7. Technical details (On-Grid – Form 2, Off-Grid Form 3, Hybrid – Form 4)
8. List of Inverter (s) to be submitted for Empanelment (Form 5).
9. Undertakings as per the enclosed format (Annexure 4, 5)
10. Audited certificate of year wise Turnover of the firm. (Annexure-6)
11. Manufacturing plant certifications (Annexure-7)
12. IS/IEC certifications. (Annexure-8)
13. Data Sheets (Annexure-9)

14. Those companies who had already empaneled in the First Edition of OEM Empanelment of ANERT held in February 2020 need not submit the documents required under Sl. No 2, 3, 4, 9, 10 and 11. However, they shall upload an Undertaking stating that the company is already empaneled in the I Edition of OEM Empanelment Process in the provisions for upload in the online application form instead of the documents actually required for Sl. No 2, 3, 4, 9, 10 & 11.

Application fee – 25,000/- (NEFT/ RTGS) + 3,000 (For each product Empanelment)

*Annual Fee – 5,000/-(NEFT/ RTGS) (*applicable only for the OEM's empanelled in the First Edition of **OEM Empanelment of ANERT Feb 2020**)

Bank: State Bank of India
LIC Junction Branch
Pattom, Thiruvananthapuram

Name: Director ANERT
Account number: 67242882331
IFSC: SBIN0070212

Note: Please refer to the general instructions on empanelment process before filling the form.

1. Contents

2. General instructions on Empanelment process:

1. Only Original Equipment Manufacturer (OEM) is eligible for empanelment in ANERT.
2. The OEM shall be either Proprietary/ Limited Company/ PSU registered in India with a valid Company Registration Certificate. Please attach the registration certificate as Annexure 1.
3. The OEM shall be in the concerned business for last two years in India.
4. The firm should have registration number with GST. Please attach the GST certificate as Annexure 2.
5. The interested OEMs of inverters shall submit the application through the link of ANERT website www.anert.gov.in.
6. Empaneling process will be done for
   2.1. On Grid Inverters
   2.2. Off Grid Inverters
   2.3. Hybrid Inverters
7. Empaneling the manufacturers of On-Grid inverters/ Off-Grid inverters / Hybrid inverters will be conducted once in 3 months.
8. The Applicant shall pay an Empanelment Fee of Rs.25000/- initially and annual fee of Rs5000/- in subsequent years. In addition to the above amount, the Manufacturer shall pay additional payments at the rate of Rs3000/- for each product to be empaneled in ANERT. Each product will be defined according to the MNRE Guidelines Order No. 223/36/2018-R&D Coord (QC) Dt. 09-04-2019. Accordingly, a product family can be defined by the maximum configuration of components/sub-assemblies plus a description of how the models are constructed from the maximum configuration using these components and sub-assemblies. All models, which are included in the family typically, have the same hardware and same firmware essential to ensure conformity with applicable requirements.

   The payment shall be done through NEFT/RTGS to the following account and the details (UTR No, Name of the Remitter, Date of Payment, Total Amount Paid, the Split up of Payment, Bank from which the Payment is made) shall be furnished in the space provided in Form -1. Please attach online payment acknowledgment as Annexure 3.

   The Director, ANERT

   Acc No : 67242882331
   Bank : State Bank of India
   Branch : LIC Junction, Pattom
   IFSC : SBIN0070212
9. The Empanelment is valid as per the validity of the corresponding certifications (IEC/IS etc.) provided the OEMs renews their Empanelment status by paying the annual fee of Empanelment Status.

10. All the IEC certifications listed as per the clause 7 in Section 4 of ON-Grid inverters and as per the clause 8 in section 8 of Hybrid-inverters are mandatory except the recommended (*) ones.

11. During the selection of OEMs, ANERT may ask for any clarifications, if any, with a tentative deadline.

12. Qualified OEMs will be empaneled and notified by ANERT and will be given User Name and Password for uploading their products at ANERT through BuyMySun Portal, which will be verified, approved and published.

13. The Manufacturer shall submit the IEC certificates along with test reports of On Grid inverters/ Off grid inverters / hybrid inverters as per technical specifications with respective filled Performa (Form-2, Form -3, Form -4 whichever necessary) for each product and corresponding Data Sheets. The inverters should be tested from the MNRE approved test centers / NABL/ BIS/ IEC accredited testing-calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.

14. The inverter manufacturers shall have a minimum one number of **service assistance unit / service partner** in Kerala State. The manufacturers should provide the details of service assistance unit / service partner with address, name of the contact person, mobile no. and email ID etc. (Form -1). If the manufacturer does not have a service assistance unit / service partner in Kerala, the firm should give an undertaking stating that the firm will set up a service assistance unit or arrange a service partner in Kerala, once empaneled.

15. The manufacturers shall furnish the minimum warrantee certificate (OEM warrantee) of minimum 5 years for the inverters offered for empanelment.

16. The manufacturers shall submit an undertaking on a non-judicial stamp paper of Rs.200/- for providing service support during the entire warrantee period of 5 years. Please attach the undertaking as Annexure 4.

17. The manufacturers shall submit an undertaking on a judicial stamp paper worth of Rs200/- stating that they have not been blacklisted by any of the DISCOM’s / Utilities/MNRE/ State Nodal Agencies (SNA) in the past. Please attach the undertakings as Annexure 5.

18. ANERT will conduct factory visits and witness the manufacturing process and tests, If found to be necessary

19. ANERT reserves the right to delist such of the manufacturers from the empanelment list in case the performance and service of inverters is not satisfactory within the guaranteed period.

3. Form-1:

APPLICATION FOR EMPANELMENT OF INVERTERS

1.	Name of the Firm			
2.	Address of the Firm a) Tele phone/ Fax b) E-mail c) Web-site address.			
3.	Application Fee Online Payment Details a. Name of the Remitter/ Company b. UTR No. c. Date of Payment d. Amount of Payment e. Bank from which the payment is done f. Split up of Payment (Egg;- Rs25000/- + Rs3000/- per product)			
4.	Name of the Authorized Contact Person a) Mobile No. b) E-mail address.			
5.	Type of Firm Whether Proprietary/ Limited Company/ PSU			
6.	GST Registration No.			
7.	Year wise Turnover of the firm for last years Attach audited certificate as Annexure 6.	2017-18	2018-19	2019-20
8.	Whether Manufacturing Plant qualifies to any international Standards (ISO 9000 / ISO 14000 / Any other Standards) Please attach the certification as Annexure 7.			
9.	Number of service assistance units / Service Partners in Kerala, if any			
10.	(a) Name of the contact person of Service Assistance Unit / Service Partner (b) Address (c) Mobile No. (d) Email ID			

11.	Whether Undertaking submitted by the Manufacturer regarding the setting up of Service Assistance Unit / Service Partner			
12.	Types of Inverter being manufactured by firm. (i) Off Grid Inverter (ii) On Grid Inverter (iii) Hybrid Inverter			
13.	Annual Capacity of Inverter manufacturing			
14.	Actual production of inverters in last three years.	2017-2018	2018-2019	2019-2020
15.	Whether black listed by any of the DISCOMs/Utilities/MNRE/State Nodal Agency/			

Name & Signature of Authorized person with seal of the company

4. SPECIFICATIONS FOR ON-GRID INVERTERS

1. General Specifications:
   1.1. All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:
      1.1.1. The name or trademark of the manufacturer or supplier.
      1.1.2. A model number, name or other means to identify the equipment.
      1.1.3. A serial number, code or other markings allowing identification of manufacturing location and the manufacturing batch or date within a three-month time period.
      1.1.4. Input voltage, type of voltage (A.C. or D.C.), frequency, and maximum continuous current for each input.
      1.1.5. Output voltage, type of voltage (A.C. or D.C.), frequency, maximum continuous current, and for A.C. outputs, either the power or power factor for each output.
      1.1.6. The Ingress Protection (IP) rating
2. The inverter output shall be 415 VAC, 50 Hz, 3 phase OR 230 VAC, 50 Hz, 1 phase.
3. The inverter shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of inverter component failure or from parameters beyond the inverter's safe operating range due to internal or external causes.
4. The Grid Connected Inverters from 2kW to 100kW will be empaneled.
5. The Technical Specification of On-Grid Inverters are summarized below:

Specifications of Inverters	
Parameters	**Detailed specification**
Nominal voltage	230V/415V
Voltage Band	Between 80% and 110% of V nominal
Nominal Frequency	50 Hz
Operating Frequency Range	47.5 to 50.5 Hz
Waveform	Sine wave
Harmonics	AC side total harmonic current distortion < 3%
Ripple	DC Voltage ripple content shall be not more than 1%
Efficiency	Efficiency shall be >97%
Casing protection levels	Degree of protection: Minimum IP-54 for internal units and IP-65 for outdoor units
Operating ambient Temp range	-10 to + 60 degree Celsius
Operation	Completely automatic including wakeup, synchronization (phase locking) and shut down
MPPT	MPPT range must be suitable to individual array voltages
Protections	Over voltage: both input and output Over current: both input and output Over / Under grid frequency Over temperature Short circuit Lightning Surge voltage induced at output due to external source

	Islanding
Ingress Protection	IP 65
Recommended LED indications	ON Grid ON Under/ Over voltage Overload Over temperature
Recommended LCD Display on front Panel	DC input voltage DC current AC Voltage (all 3 phases) AC current (all 3 phases) Frequency Ambient Temperature Instantaneous power Cumulative output energy Cumulative hours of operation Daily DC energy produced
Communication Interface	RS485/ RS232/Wi-Fi (with or without USB)

6. The Technical Specification for Interconnection are summarized below:

Sl No,	**Parameters**	**Requirements**	**Reference**
1	Overall conditions of service	Reference to regulations	Conditions for Supply of Electricity
2	Overall Grid Standards	Reference to regulations	Central Electricity Authority (Grid standards) Regulations 2010
3	Equipment	Applicable industry standards	IEC/EN standards
4	Safety and Supply	Reference to regulations, (General safety requirements	Central Electricity Authority (Measures of safety and electricity supply) Regulations, 2010 and subsequent amendments
5	Meters	Reference to regulations and additional conditions issued by the commission.	Central Electricity Authority (Installation & operation of meters) regulations 2006 and subsequent amendments
6	Harmonic current	Harmonic current injections from a generating stations shall not exceed the limits specified in IEEE 519	IEEE 519 relevant CEA (Technical Standards for connectivity of the distributed generation resource) Regulations 2013 and subsequent amendments
7	Synchronization	Photovoltaic system must be equipped with a grid frequency synchronization device, if the system is using synchronizer inherently built in to the inverter then no separate synchronizer is required	Relevant CEA (Technical Standards for Connectivity of the distributed generation resources) regulations 2013 and subsequent amendments.

8	Voltage	The voltage-operating window should minimize nuisance tripping and should be under operating range of 80% to 110% of the nominal connected voltage. beyond the clearing time of 2 seconds, the Photovoltaic system must isolated itself from the grid	
9	Flicker	Operation of Photovoltaic system should not cause voltage flicker in excess of the limits stated in IEC 61000 or other equivalent Indian standards if any	Relevant CEA regulations 2013 and subsequent if any, (Technical standards for connectivity of the distributed generation resource)
10	Frequency	When the distribution system frequency deviates outside the specified limits (50.5 Hz on upper side and 47.5 Hz on lower side) up to 0.2 sec, the Photovoltaic systems shall automatically disconnect from grid and be in island mode.	
11	DC injection	Photovoltaic system shall not inject DC current greater than 0.5% of full rated output at the interconnection point or 1% rated inverter output current into distribution system under any operating conditions.	
12	Power Factor	While the output of the inverter is greater than 50%, a lagging power factor greater than 0.9 shall be maintained.	
13	Islanding and Disconnection	The photovoltaic system in the event of voltage or frequency variations must island/disconnect itself with the time stipulated as per IEC standards	
14	Overload and Overheat	The inverter should have the facility to automatically switch off in case of overload or overheat and should restart when normal conditions are restored	

7. The IEC Certifications of On-Grid Inverters are summarized below:

Standard	**Description**
IEC 61683	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 61727	Photovoltaic (PV) systems- Characteristics of the utility interface
IEC 62109-1 Or Equivalent EN Certification	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 62109-2 Or Equivalent EN Certification	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
IEC 61000-3-3/ 3-11/ 3-5 Or Equivalent EN Certification	Electromagnetic compatibility (EMC) - Part 3-11; Limits; Limitation of Voltage Change, Voltage Fluctuations and Flicker in Public Low-Voltage Supply Systems; Rated Current <16A / >16A and <75A / >75A per Phase respectively
IEC 61000-3-2/ -3-12/ -3-4 Or Equivalent EN Certification	Electromagnetic compatibility (EMC) - Part 3-12; Limits; Limits for Harmonic Currents produced by equipment connected to the public low voltage systems with Rated Current <16A / >16A and <75A / >75A per Phase respectively
*IEC 61000-6-1 / 6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for residential and commercial / industrial environments
*IEC 61000-6-3 / 6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for residential and commercial / industrial environments
IEC 62116	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEC 60068-2-1	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-14	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-30	Environmental testing - Part 2-30: Tests - Test Db:, Damp heat, cyclic (12 h + 12 h cycle)

***Recommended but not mandatory**

5. Form-2

TECHNICAL DETAILS OF ON-GRID INVERTERS

Make :

Model no.:

Parameters	Value
Max. Input DC Power	
Max. Input Voltage	
MPP voltage range/rated input voltage	
Rated output power	
Nominal AC voltage	
Max. output current	
Power factor at rated power	
Max. efficiency/ European efficiency	
Dimensions in mm (W/H/D)	
User Interface: (RS 485 or Wi-Fi any others)	
Warrantee (years)	
Mention the IEC/IS Certifications for the product Please attach IEC/ IS certifications as Annexure 8.	
Data sheet of each product attached or not (Yes/ No). Please attach the data sheet (s) as Annexure 9.	

NOTE:

1. Please read the guidelines on specification before filling up the Form-2.
2. The Form-2 must be filled and attach with each product for the empanelment process.
3. Enclose a copy of all IEC/IS certificates along with test reports of On Grid inverters as per technical standards and grid connectivity standards.
4. Enclose Data Sheet along with each product

6. SPECIFICATIONS FOR OFF-GRID INVERTERS

Power Conditioning Unit (inverter) comprises of charge controller with MPPT technology that is either integrated with the inverter or as a separate unit.

1. General Specifications:
   1.1. All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:
      1.1.1. The name or trademark of the manufacturer or supplier.
      1.1.2. A model number, name or other means to identify the equipment.
      1.1.3. A serial number, code or other markings allowing identification of manufacturing location and the manufacturing batch or date within a three-month time period.
      1.1.4. Input voltage, type of voltage (A.C. or D.C.), frequency, and maximum continuous current for each input.
      1.1.5. Output voltage, type of voltage (A.C. or D.C.), frequency, maximum continuous current, and for A.C. outputs, either the power or power factor for each output.
      1.1.6. The Ingress Protection (IP) rating
2. Off- Grid Inverters from 1kW/1kVA to 50kW/50kVA will be empaneled
3. The control system should continuously adjust the voltage of the generator to optimize the power available. The power conditioner must automatically re-enter standby mode when input power reduces below the standby mode threshold. Front Panel display should provide the status and fault indication (if any)
4. The inverter should have IGBT/MOSFET based controlling elements and current regulated systems
   4.1. Operational Voltage Range: Suitable System Voltage according to the battery bank and panel array
5. The inverter must have MPPT power electronics for the maximum extraction of PV power
6. The inverter shall provide electronic protection against the following type of faults:
   6.1. Overload
   6.2. Over temperature
   6.3. Reverse polarity
   6.4. Short circuit (circuit breaker & electronic protection against sustained fault).
   6.5. Over-load protection.
   6.6. Under voltage & Over-voltage of Battery.
   6.7. Auto/ Manual re-connects provision.
   6.8. Reverse polarity protection both for the PV array and Battery bank (DC)
7. Auto resetting electronic over current protection
8. The inverter must have a RS485/RS232 interface
9. The inverter shall conform to IEC 61683/ IS 61683 for efficiency measurement, and IEC 60068-2 (1,2,14,30) or equivalent BIS standard for environmental testing.
   9.1. Operational Voltage Range: Suitable System Voltage according to the battery bank and panel array
   9.2. Type: Self commuted, current regulated, IGBT/ MOSFET based.
   9.3. Output voltage: Output voltage 230V/415V
   9.4. Output frequency :50 Hz
   9.5. THD: Less than (<) 5%
   9.6. Efficiency: 90% or above at full load.
   9.7. Ambient temperature: 5 to 55°C
10. Protections:

10.1. Short circuit (circuit breaker & electronic protection against sustained fault)
10.2. Over-load protection
10.3. Under voltage & Over-voltage of Battery
10.4. Auto/ Manual re-connects provision
10.5. Reverse polarity protection both for the PV array and Battery bank (DC)

11. Ingress Protections: IP20/ IP 21 or above
12. Other Features:
    12.1. Surge Protection: 150% of the rated capacity for a period of 10 seconds
    12.2. Acoustic Noise Level ≤ 50 dB
13. Recommended Indicators / Displays / Alarms
    13.1. Digital Display(s) of input DC SPV voltage & current, along with Energy Meter
    13.2. Digital Display (s) AC output voltage, frequency, power and current
    13.3. Digital Display of output AC kWh meter (Daily/ Cumulative)
    13.4. Overload Alarm / cut-off
    13.5. System Cut-off Indicator
    13.6. System Reset Button.
    13.7. Battery voltage and current.
    13.8. SPV charging.
    13.9. Battery Charge Level LED Indicator (s) – Low, Medium, High, Full.
    13.10. Battery Low indicator and Alarm/ cut-off.

7. Form-3

TECHNICAL DETAILS OF OFF-GRID INVERTERS

Make :

Model no./Name:

Parameters	Value
Max. permitted PV power	
MPP voltage range	
Max. input voltage	
Nominal input voltage	
Max. output power	
Max. continuous output power	
Max. efficiency	
Total Harmonic Distortion	
Power factor	
User Interface: (RS 485 / RS 232/ Wi-Fi)	
Warrantee (years)	
Mention the IEC/IS Certifications for the product Please attach IEC/ IS certifications as Annexure 7.	
Data sheet of each product attached or not (Yes/ No). Please attach the data sheet (s) as Annexure 8.	

NOTE:

1. Please read the guidelines on specification before filling up the Form-3.
2. The Form-3 must be filled and attach with each product for the empanelment process.
3. Enclose a copy of all IEC/IS certificates along with test reports of Off Grid inverters as per technical standards.
4. Enclose Data Sheet along with each product

8. SPECIFICATIONS FOR HYBRID GRID INVERTERS

1. General Specifications:
   1.1. All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:
      1.1.1. The name or trademark of the manufacturer or supplier.
      1.1.2. A model number, name or other means to identify the equipment.
      1.1.3. A serial number, code or other markings allowing identification of manufacturing location and the manufacturing batch or date within a three-month time period.
      1.1.4. Input voltage, type of voltage (A.C. or D.C.), frequency, and maximum continuous current for each input.
      1.1.5. Output voltage, type of voltage (A.C. or D.C.), frequency, maximum continuous current, and for A.C. outputs, either the power or power factor for each output.
      1.1.6. The Ingress Protection (IP) rating

2. The Hybrid inverter output shall be 415 VAC, 50 Hz, 3 phase / 230 VAC, 50 Hz, 1 phase.
3. The Hybrid inverter should have all the technical requirements for connecting to the Grid and provision of Intentional Islanding with facility for connecting to a battery bank
4. The Hybrid inverter shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of inverter component failure or from parameters beyond the inverter's safe operating range due to internal or external causes.
5. Hybrid Inverters from 2kW/2kVA to 50kW/50kVA will be empaneled.
6. The Technical Specification of Hybrid Inverters are summarized below:

Specifications of Inverters	
Parameters	**Detailed specification**
Nominal voltage	230V/415V
Voltage Band	Between 80% and 110% of V nominal
Nominal Frequency	50 Hz
Operating Frequency Range	47.5 to 50.5 Hz
Waveform	Sine wave
Harmonics	AC side total harmonic current distortion < 5%
Ripple	DC Voltage ripple content shall be not more than 1%
Efficiency	Efficiency shall be >95%
Casing protection levels	Degree of protection: Minimum IP-54 for internal units and IP-65 for outdoor units
Operating ambient Temp range	-10 to + 60 degree Celsius
Operation	Completely automatic including wakeup, synchronization (phase locking) and shut down
MPPT	MPPT range must be suitable to individual array voltages in power packs
Protections	Over voltage: both input and output Over current: both input and output Over / Under grid frequency

	Over temperature Short circuit Lightening Surge voltage induced at output due to external source Islanding
Ingress Protection	IP 20/ IP 21
Recommended LED indications	ON Grid ON Under/ Over voltage Overload Over temperature
Recommended LCD Display on front Panel	DC input voltage DC current AC Voltage (all 3 phases) AC current (all 3 phases) Frequency Ambient Temperature Instantaneous power Cumulative output energy Cumulative hours of operation Daily DC energy produced
Communication Interface	RS485/ RS232 (with or without USB)

7. The Technical Specification for Interconnection are summarized below:

Sl No,	**Parameters**	**Requirements**	**Reference**
1	Overall conditions of service	Reference to regulations	Conditions for Supply of Electricity
2	Overall Grid Standards	Reference to regulations	Central Electricity Authority (Grid standards) Regulations 2010
3	Equipment	Applicable industry standards	IEC/EN standards
4	Safety and Supply	Reference to regulations, (General safety requirements	Central Electricity Authority (Measures of safety and electricity supply) Regulations, 2010 and subsequent amendments
5	Meters	Reference to regulations and additional conditions issued by the commission.	Central Electricity Authority (Installation & operation of meters) regulations 2006 and subsequent amendments
6	Harmonic current	Harmonic current injections from a generating stations shall not exceed the limits specified in IEEE 519	IEEE 519 relevant CEA (Technical Standards for connectivity of the distributed generation resource) Regulations 2013 and subsequent amendments
7	Synchronization	Photovoltaic system must be equipped with a grid frequency	Relevant CEA (Technical Standards for Connectivity of the

		synchronization device, if the system is using synchronizer inherently built in to the inverter then no separate synchronizer is required	distributed generation resources) regulations 2013 and subsequent amendments.
8	Voltage	The voltage-operating window should minimize nuisance tripping and should be under operating range of 80% to 110% of the nominal connected voltage. beyond the clearing time of 2 seconds, the Photovoltaic system must isolated itself from the grid	
9	Flicker	Operation of Photovoltaic system should not cause voltage flicker in excess of the limits stated in IEC 61000 or other equivalent Indian standards if any	Relevant CEA regulations 2013 and subsequent if any, (Technical standards for connectivity of the distributed generation resource)
10	Frequency	When the distribution system frequency deviates outside the specified limits (50.5 Hz on upper side and 49.5 Hz on lower side)up to 0.2 sec, the Photovoltaic systems shall automatically disconnect from grid and be in island mode.	
11	DC injection	Photovoltaic system shall not inject DC current greater than 0.5% of full rated output at the interconnection point or 1% rated inverter output current into distribution system under any operating conditions.	
12	Power Factor	While the output of the inverter is greater than 50%, a lagging power factor greater than 0.9 shall be maintained.	
13	Islanding and Disconnection	The photovoltaic system in the event of voltage or frequency variations must island/disconnect itself with the time stipulated as per IEC standards	
14	Overload and Overheat	The inverter should have the facility to automatically switch off in case of overload or overheat and should restart when normal conditions are restored	

8. The IEC Certifications of Hybrid Inverters are summarized below:

Standard	Description
IEC 61683	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 61727 or VDE-AR-N 4105	Photovoltaic (PV) systems Characteristics of the utility interface
IEC 62109-1	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 62109-2	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
IEC 61000-3-3/ 3-11/ 3-5	Electromagnetic compatibility (EMC) - Part 3-11; Limits; Limitation of Voltage Change, Voltage Fluctuations and Flicker in Public Low-Voltage Supply Systems; Rated Current <16A / >16A and <75A / >75A per Phase respectively
IEC 61000-3-2/ -3-12/ -3-4	Electromagnetic compatibility (EMC) - Part 3-12; Limits; Limits for Harmonic Currents produced by equipment connected to the public low voltage systems with Rated Current <16A / >16A and <75A / >75A per Phase respectively
*IEC 61000-6-1 /6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for residential and commercial / industrial environments
*IEC 61000-6-3 /6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for residential and commercial / industrial environments
IEC 62116 /IEEE 1547 or IEEE 1547.1 / UL 1741	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEC 60068-2-1	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-14	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-30	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)

***Recommended but not mandatory**

9. Form-4

TECHNICAL DETAILS OF HYBRID INVERTERS

Make :

Model no./Name:

Parameters	Value
Max. Input DC Power	
Max. Input Voltage	
MPP voltage range/rated input voltage	
Rated output power	
Nominal AC voltage	
Max. output current	
Power factor at rated power	
Max. efficiency/ European efficiency	
Dimensions in mm (W/H/D)	
User Interface: (RS 485 or any others)	
Warranty (years)	
Mention the IEC/IS Certifications for the product Please attach IEC/ IS certifications as Annexure 8.	
Data sheet of each product attached or not (Yes/ No). Please attach the data sheet (s) as Annexure 9.	

NOTE:

1. Please read the guidelines on specification before filling up the Form-4.
2. The Form-4 must be filled and attach with each product for the empanelment process.
3. Enclose a copy of all IEC/IS certificates along with test reports of Hybrid inverters as per technical standards and grid connectivity standards.
4. Enclose Data Sheet along with each product

10. Form-5

LIST OF INVERTER PRODUCTS SUBMITTED FOR EMPANELMENT

Sl. No	Make	Model	On-Grid/ Off-Grid/ Hybrid	IEC 61683	IEC 61727 or Equivalent	IEC 62109-1 (Or Equi. EN Certification)	IEC 62109-2 (Or Equi. EN Certification)	*IEC 61000-6-1 / 6-2	*IEC 61000-6-3 /6- 4	IEC 61000-3-3/ 3-11/ 3-5 (Or Equi. EN Certification)	IEC 61000-3-2/ -3-12/ -3-4 (Or Equi. EN Certification)	IEC 62116/ UL 1741 / IEEE 1547.1	IEC 60068-2-1	IEC 60068-2-2	IEC 60068-2-14	IEC 60068-2-30	Data-sheet
1																	
2																	
3																	
4																	
5																	
6																	

*Recommended only; not mandatory

Note: Please (✓) tick the IEC certifications and datasheets submitted to the corresponding model.

All the IEC certifications are mandatory except the recommended (*) ones.

11.LIST OF ANNEXURES

The manufacturers must attach the list of annexures as per the attached format:

Sl No:	ANNEXURES	DESCRIPTION
1. *	Annexure 1:	Manufacturer registration certificate.
2. *	Annexure 2:	GST Certificate.
3.	Annexure 3:	Acknowledgement of Online Payment.
4. *	Annexure 4:	Undertaking on service support.
5. *	Annexure 5:	Undertaking stating that firm has not been blacklisted in SNA/ MNRE/ DISCOM.
6. *	Annexure 6:	Year wise turnover of the firm for last 3 years.
7. *	Annexure 7:	Manufacturing plant certifications (ISO 9000/14000/ Any Other Certifications).
8.	Annexure 8:	IS/ IEC certifications.
9.	Annexure 9:	Data sheet of Inverters.
10	Annexure 10	Undertaking stating that OEM Company is already empanelled in the first edition of OEM Empanelment process completed by ANERT on Feb 2020

*Required for the OEM companies who are empaneling with ANERT for the first time

12.CHECKLIST FOR DOCUMENT SUBMISSION

The Empanelment manufactures must submit all the documents as per the attached format.

Sl No:	Annexures	Remarks	Checklist (✓)
1	Cover letter on letterhead of the firm.		
2*	Inverter manufacturer registration certificate.		
3*	Company profile.		
4	Details of Inverters and manufacturers (Form 1)		
5	Technical Data sets (Form-2/ Form-3/ Form-4)		
6	List of Inverters submitted for Empanelment (Form 5)		
7	Name and Receipt/ Acknowledgement of online payment. (Annexure-3)		
8**	List of Annexures.		

*Required for the OEM companies who are empaneling with ANERT for the first time

** Please refer to Annexure List under Sl. No.11.