Revised Type Test Requirements of NTDC

1. In order to encourage more suppliers / manufacturers to enhance competition, the condition of Pre-Type testing of the material / equipment for T/Line and Grid Station is being relaxed upto **31-12-2018.** Some minor modifications have also been proposed in the Policy so that more options are available to the manufacturers.

2. In lieu of said relaxation, following new provisions have been added in the Policy:-

   i. The bidder will submit tentative schedule of type testing alongwith an **Undertaking** in his bid that in case of award of contract, he will carry out type tests as per NTDC Type Test Policy within the quoted Bid price without effecting the delivery/ completion period stipulated in the Bidding Documents. In case of failure to submit an Undertaking & Schedule of type tests along with the bid:
      I. In supply contract, , his bid shall be considered liable for rejection.
      II. In case of EPC contract, such manufacturer shall not be accepted and bidder will be bound to replace the same with acceptable manufacturer. In case of non conformance, the bid shall be rejected.

   ii. During evaluation, the Engineer may seek any information and timelines regarding missing tests, which in his opinion, are required to be performed as per Specifications from the bidder(s) through post bid clarification. In case of non-submission of the requisite missing data / confirmation by the bidder within the stipulated time, the bid shall be rejected.

   iii. After issuance of Notification of Award, the bidder shall be required to furnish the confirmed Testing Schedule on the Letter Head of prescribed Testing Lab before signing of the Contract Agreement within a period set for such purpose in the Bidding Documents. In case of delay or non-submission of the requisite details, NTDC shall have the right to cancel the NOA including encashment of bid security and move to next lowest responsive bidder.

   iv. After award of contract agreement, the bidder shall carry out the requisite type tests and execute the contract within stipulated time period. In case of failure:
      I. The Purchaser may exercise its right of termination of the Contract and other remedies available according to relevant provisions of the Contract.
      II. In case of EPC contract, the EPC contractor will be required to change the manufacturer as proposed by the employer.

(GM D&E)
NTDC

GM (PCM)
NTDC

3. After the said Expiry Date **i.e., 31-12-2018**, the bidder shall offer only type tested equipment, mentioned below, from one of the testing Laboratories as per **Annexure-A** in accordance with tests defined in **Annexure-B** as per relevant NTDC tender specifications/ IEC along with the bid.

Grid Station Equipment

i. Circuit Breaker
ii. Disconnector
iii. Potential Transformer/Capacitive Voltage Transformer
iv. Current Transformer
v. Surge Arrester
vi. Insulators (Disc & Post)
vii. Hardware (Connectors and Strings
viii. GIS

Transmission Line Equipment

i. Conductor
ii. Hardware and accessories
iii. Spacer damper
iv. Stock Bridge Vibration Damper
v. Insulators

Transformer & Shunt Reactor Bushings

"Transformer & Shunt Reactor Bushings shall either be from M/s Trench Hefley (France/ Switzerland); M/s Passoni & Villa Italy; M/s F&G Germany & M/s. ABB Sweden which have proven performance in NTDC system or pre-type tested transformer bushings from an equivalent manufacturer duly tested at any STL Lab (Annexure-A) as per IEC 60137 and NTDC Specification ."

In case of non-submission of type test reports with the bids or if test reports supplied are not from one of the labs given in Annexure-A along with the bid, as per scope given in Annexure B, the same shall be considered technically non-responsive.

4. The validity of the Type Test reports shall be 10 years from the date of issuance of the reports. However, fresh type tests shall be required/repeated if;

a) The applicable standards have changed
b) The validity of the test reports has expired
c) The material used for the manufacturing has changed
d) The design has changed
e) The sub-contractors / suppliers have changed
f) The manufacturing process has changed

g) Country of origin has changed
h) Manufacturing facility has changed

5. No Inspection Report issued by any STL member lab, in respect of Tests which are exclusively required to be acrried out from the Labs as per Annexure-A shall be accepted. Only those type test reports of the equipment shall be accepted, which have been performed at the premises of the STL members

6. The Type Test Reports shall include the information regarding outsourced components /parts of the equipment type tested. The Report shall also include complete identification of the equipment alongwith drawings

Note:

(i) The mnaufcaturers are encouraged to avial this opportunity for carrying out type tests as per NTDC Policy. NTDC can also nommiate its inspectors upon request provided that all such costs shall be borne by the manufacturer.

(ii) NTDC reserves the right to change all or any parts of the type test policy at any time in the best interest of company.

Annexure-A

(List of Approved /STL member labs)

1. Centro Elettrotecnico SperimentaleItaliano S.p.A.
   Via Rubattino 54
   20134 Milano MI
   Italy

2. Institut
   "PrueffeldfuerelektrischeHochleistungstechnik" GmbH (IPH)
   LandsbergerAllee 378A
   D-12681 Berlin
   Germany

3. FGH Engineering & Test GmbH
   Hallenweg 40
   D-68219 Mannheim
   Germany

4. LME (Laboratoires des MatÃ©rielsElectriques)
   Site des RenardiÃ¨res
   EDF- R-&-D-LME
   Avenue des RenardiÃ¨res
   77818 Moret-sur-LoingCedex
   France.

5. Centre d'EssaisRhodanien De l'Appareillage
   CERDA
   ALSTOM Grid
   BP No. 1321
   130 Rue LÃ©on Blum
   69611 Villeurbanne Cedex
   France.

6. L2E VOLTA
   Schneider Electric Industries SAS
   38050 Grenoble Cedex 9
   France

7. Central Research Institute of Electric Power Industry(CRIEPI)
   2-6-1, Nagasaka
   Yokosuka-shi
   Kanagawa 240-0196
   Japan

8. Hitachi Ltd., High Voltage & High Power Testing Laboratory
   1-1, Kokubu-cho
   Hitachi-shi
   Ibaragi 316-8501
   Japan

9. MEIDENSHA CORPORATION High Power Testing Laboratory
   515, KaminakamizoHigashimakado
   Numazu-shi
   Shizuoka 410-8588
   Japan

10. Mitsubishi Electric Corp. High Voltage & High Power Testing Laboratories
    8-1-1, Tsukaguchi-Honmachi
    Amagasaki-shi
    Hyogo 661-8661
    Japan

11. High Voltage and High Power Testing Laboratory Nissin Electric Co., Ltd
    47, Umezu-Takase-cho
    Ukyo-ku, Kyoto-shi
    Kyoto 615-8686
    Japan

12. Toshiba Corp. Hamakawasaki High Voltage and High Power Testing Laboratory
    2-1, Ukishima-cho
    Kawasaki-ku, Kawasaki-shi
    Kanagawa 210-0862
    Japan

13. DNV GL - Energy, Power TIC
    Utrechtseweg 310
    6812 AR Arnhem
    The Netherlands

14. DNV GL - Energy, Power TIC
    High Power and High Voltage Laboratories
    4379 County Line Road, Chalfont, PA 18914
    USA

15. ZkuÅ¡ebnictvÃ¬, a.s.(ZKU)
    PodnikatelskÃ¡ 547
    190 11 Prague 9
    Czech Republic

16. High Power, high voltage Testing & Evaluation Division,
    12, Bulmosan-ro 10 beon-gil
    Seongsan-gu, Changwon-si
    Gyeongsangnam-do, 642-120
    South Korea

17. Power Apparatus Testing & Evaluation Division in Ansan office
    111, Hanggaul-ro
    Sangnok-gu, Ansan-si,
    Gyeonggi-do, 426-910
    South Korea

18. ABB Switzerland Ltd.
    High Voltage Products and Components, Dept. PGHV-X
    Fabrikstrasse 13, CH-5400 Baden
    Switzerland

19. High-Voltage Institute Kassel
    GE ALSTOM Grid GmbH
    Lilienthalstrasse 150
    D-34123 Kassel
    Germany

20. ABB AG
    CalorEmag Medium Voltage Products
    OberhausenerStrasse 33
    D-40832 Ratingen
    Germany

21. Siemens AG
    Nonnendammallee 104
    D-13629 Berlin
    Germany

22. Siemens AG
    Carl-Benz-Strasse 22
    D-60386 Frankfurt am Main
    Germany

23. PEHLA-Laboratory Regensburg
    Rathenaustr. 2
    D-93055 Regensburg
    Germany

24. ABB AB High Power Laboratory
    LyviksvÃ¤gen 14
    SE-77180 Ludvika,
    Sweden.

25. STRI AB
    P.O Box 707
    77180 Ludvika,
    Sweden.

26. NEXANS Norway AS
    P.O. Box 42
    1751 Halden
    Norway

27. NEFI
    P.O. Box 108 Sentrum
    3701 Skien,
    Norway.

28. Powertech Laboratories Inc.
    12388 - 88th Avenue
    Surrey, British Columbia, V3W 7R7
    Canada

29. Eaton's Cooper Power Systems Division
    Thomas A. Edison Power Test Laboratories
    11131 Adams Road
    Franksville, WI 53126
    USA.

30. LAPEM-CFE
    Jefe Departamento Distribution
    CP 36630 Irapuato
    GTO Mexico

31. S&C Electric Company
    6601 N Ridge Boulevard
    Chicago, IL 60626
    USA

32. Eaton Corporation
    200 Westinghouse Circle
    Horseheads,NY 14845
    USA

33. Vasgolyoutca 2-4
    H-1158 Budapest
    Hungary

34. KEMA Lab
    Chalfont, USA

35. Intertek Ausgrid Testing & Certificate Lab
    Australia

36. Kinectrics Lab
    800 Kipling Ave. Etobicoke, ON M8Z 5G5,
    Canada

37. Polotecnico Di Milano
    Plazza Leonardo da Vinci, 32, 20133 Milan
    Italy

38. SAG Frankfurt
    Pittlerstraße 44 63225 Langen,
    Germany

39. EGU HV Laboratory A.S
    Podnikatelska 267 190 11 Prague 9, Bechovice
    Czech Republic

40. Cerisi Laboratario Italiano
    Gomma
    Italy

Annexure-B

(Scope of Type Testing)

A. G/s Equipment

Scope of Type Test	Approved labs
220 kV Auto transformer (P-169:2009)	
The following type test shall be carried out on one auto-transformer in each group/lot of auto-transformers with the same characteristics and ratings: 1. Temperature rise. 2. Full wave lighting impulse test on line and neutral terminals. 3. Chopped wave lighting impulse test. 4. Measurement of harmonics on no-load current. 5. Measurement of zero-sequence impedance. 6. Measurement of sound level. 7. Measurement of power taken by cooling fans. Please note that NTDCL reserves the right to conduct short circuit test on transformers	Any Independent lab accredited by ISO/IEC 17025. Manufacturer's lab shall also be acceptable.
132 kV CBs (P-193:2010)	
1. Dielectric tests. 2. Measurement of the resistance of the main circuit. 3. Measurement of Temperature and Temperature-Rise. 4. Short-time withstand current and peak withstand current tests. 5. Short-circuit current making and breaking tests. 6. Critical current test. (if applicable) 7. Earth fault test. 8. Capacitive current switching tests. (as per requirement) 9. Short-line fault test. 10. Out of phase making & breaking test. 11. Electrical Endurance test, performance of No. of switching operations at Max. Continuous current carrying capacity of the offered circuit breaker.	Any lab as per Annex-A
12. High Temperature test. 13. Temperature rise test of control and auxiliary circuit. 14. Radio Interference Voltage Test. 15. Verification of IP coding test. 16. Tightness test. 17. Electromagnetic Compatibility (EMC) tests. 18. Mechanical operation test at ambient temperature including extended mechanical endurance test. 19. Static terminal load test.	**i.** Any Independent lab accredited by ISO/IEC 17025 **ii.** Any lab as per Annex-A **iii.** Inspection reports issued by any STL Lab

220 kV and 500 kV CBs (P-171:2008)	
1. Dielectric Tests. 2. Measurement of the resistance of the main circuit (contact resistance). 3. Temperature rise tests. 4. Short-time withstand current and peak withstand current tests. 5. Short circuit current making and breaking tests. 6. Capacitive current switching tests: Line-charging current breaking tests. 7. Capacitive current switching tests: Cable-charging current breaking tests. 8. Critical current tests (if applicable). 9. Short line fault tests. 10. Out-of-phase making and breaking tests. 11. Electrical endurance tests. 12. Single phase and double earth fault tests. 13. Single capacitor bank switching tests. 14. Back-to-back capacitor bank switching tests. 15. Switching of shunt reactors.	Any lab as per Annex-A
16. Low and high temperature tests. 17. Test to prove operation under severe ice conditions. 18. Radio interference voltage (RIV) tests. 19. Tightness tests. 20. Electromagnetic compatibility (EMC) tests. 21. Mechanical operation tests at ambient temperature. 22. Verification of the degree of protection. 23. Extended mechanical endurance tests. 24. Humidity tests. 25. Static terminal load tests.	**i.** Any Independent lab accredited by ISO/IEC 17025 **ii.** Any lab as per Annex-A **iii.** Inspection reports issued by any STL Lab
<u>Disconnector, earth Switch and fast Earth Switch</u>	
a) 132 kV (P-128:2011)	
1. Impulse voltage withstand test. 2. Power frequency voltage withstand tests on main circuit (dry & wet). 3. Power frequency voltage withstand tests on auxiliary and control circuits. 4. Measurement of the resistance of main circuit including both contacts. 5. Temperature-rise test. 6. Short-time withstand current and peak withstand current tests. 7. Short circuit making performance of earthing switches. (as per requirement in GIS)	Any lab as per Annex-A

8. Bus-transfer current switching test. 9. Induced current switching test.	
10. Radio Interference Voltage tests. 11. Verification of the protection. 12. Operating and mechanical endurance tests. 13. Test to verify the proper function of the position indicating device.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
b) 220 kV and 500 kV (IEC)	
1. Dielectric tests. 2. Temperature-rise test. 3. Measurement of the resistance of main circuit. 4. Bus Transfer current Switching tests (DS). 5. Bus Charging Switching tests (DS). 6. Induced Current Switching Tests (FES). 7. Short-circuit current Making tests (FES). 8. Short time withstand current and peak withstand current tests.	Any lab as per Annex-A
9. Verification of the degree of protection. 10. EMC Tests. 11. Closing and opening capacity test for the switch device. 12. Mechanical endurance test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
<u>Potential Transformer/Capacitive Voltage Transformer</u>	
a) 132 kV Protection PT (P-129:2011)	
1. Lightning impulse withstand voltage test. 2. Power frequency voltage withstand test at Primary & secondary windings, between sections and for earthed terminal (dry & wet). 3. Partial discharge measurement during induced voltage test 4. Radio Interference Voltage (RIV) Test. 5. Short-circuit withstand capability test 6. Measurement of Temperature and Temperature-Rise. 7. Measurement of the resistance of primary and secondary windings. 8. Determination of percentage voltage (ratio) errors and phase displacement at 80%, 100% and 120% of rated voltage, at rated	Any lab as per Annex-A

frequency and at 25% and 100% of rated burden for measuring winding and at a power factor of 0.8 lagging for measuring accuracy class. 9. Determination of percentage voltage (ratio) errors and phase displacement at 5% of rated voltage and at rated voltage multiplied by the rated voltage factor, with protective burden of between 25% and 100% of protective winding and at a power factor of 0.8 lagging for protective accuracy class.	
10. Mechanical test. 11. Transmitted Overvoltage Measurement. 12. Measurement of Capacitance and dielectric dissipation Factor test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
b) Metering PT/CVT (P-206:2005) 132 kV, 220kV, 500 kV.	
1. Short circuit withstand capability tests. 2. Temperature rise test. 3. Impulse voltage test. 4. Ferro resonance tests. 5. Transient response tests. 6. Verification of measuring accuracy at 0.8 lagging power factor. 7. High frequency capacitance and equivalent series resistance measurement. 8. Stray capacitance and stray conductance measurement between low voltage terminal and earth. 9. Partial discharge test. 10. Determination of temperature coefficient.	Any lab as per Annex-A
11. Radio interference voltage test. 12. Mechanical test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab

c) 220 kV, 500 kV Protection CVT/CCVT (NESPAK)	
1. Ferro resonance tests. 2. Transient response test. 3. Temperature rise test. 4. Lightning impulse test. 5. Chopped lightning impulse test (special test). 6. Switching impulse test. 7. Wet test for outdoor type transformers. 8. Determination of errors. 9. Short circuit withstand capability test 10. High frequency capacitance and equivalent series resistance measurements in the range of the rated temperature category. 11. Stray capacitance and stray conductance measurements of the low voltage terminal. 12. Discharge test. 13. Partial discharge test. 14. Determination of the temperature coefficient.	Any lab as per Annex-A
15. Measurement of radio interference voltage test (RIV). 16. Cantilever test. 17. Mechanical test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
Current Transformer	
a) 132 kV Protection CTs(P-90:2012)	
1. Measurement of the resistance of primary and secondary windings. 2. Lightning impulse withstand voltage test. 3. Temperature-rise test. 4. Short-time withstand current and peak withstand current tests. 5. Measurement of capacitance and dielectric dissipation Factor test. 6. Determination of errors (Limits of current error, phase displacement andinstrument security factor) for measuring core. 7. Determination of errors (Limits of current error, phase displacement andcomposite error) for protective core.	Any lab as per Annex-A
8. Power frequency voltage withstand test at Primary & secondary windings and between sections (dry). 9. Power frequency voltage withstand test at Primary windings (wet). 10. Inter-turn over voltage test. 11. Partial discharge measurement. 12. Radio Interference Voltage (RIV) Test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A

13. Mechanical tests.	iii. Inspection reports issued by any STL Lab
b) Metering CTs (P-205:2005) 132 kV, 220kV, 500 kV	
1. Short –time current tests. 2. Temperature-rise test. 3. Lightning and switching impulse voltage tests on primary windings. 4. Determination of errors. 5. Wet test for outdoor type transformers. 6. Radio interference voltage measurement (RIV). 7. Measurement of capacitance and dielectric dissipation factor.	Any lab as per Annex-A
c) 220 kV , 500 kV Protection CTs (P-174:2008)	
1. Short time current tests. 2. Temperature rise test. 3. Lightning and switching impulse voltage tests on primary windings. 4. Determination of errors of protective and metering cores. 5. Chopped lightning impulse test. 6. Measuring chopped impulse test on primary winding.	Any lab as per Annex-A
7. Wet test for outdoor type transformers. 8. Measurement of capacitance and dielectric dissipation factor. 9. Mechanical tests. 10. Radio interference voltage measurement (RIV) test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab

Surge Arrester[1]

Scope of Type Test	Approved labs
a) Surge Arrester (P-181:2012)	
1. Insulation withstand tests on arrester housing (Dry & Wet): a. Lightning impulse voltage test (dry). b. Switching impulse voltage test (dry) (For type E & F arresters only). c. Power frequency voltage test (Dry & Wet). 2. Residual voltage tests; a. Steep current impulse residual voltage test. b. Lightning impulse residual voltage test. c. Switching impulse residual voltage test. 3. Long duration current impulse withstand test. (as per updated IEC) 4. Operating duty tests: a. High current impulse operating duty test. b. Switching surge operating duty test. 5. Short circuit Test. 6. Tests of arrester disconnectors (For arresters fitted with disconnectors). 7. Internal partial discharge test. 8. Seal leak rate test. 9. Current distribution test (For multi column arresters). 10. Power frequency voltage verses time test. 11. Pressure relief test. 12. Salt fog test (For polymeric housed arresters). 13. Artificial pollution test (For porcelain housed multi-unit surge arresters). 14. Bending moment test (For porcelain housed surge arresters for Um>52kV). 15. Environmental test (For porcelain housed surge arresters). 16. Radio interference voltage (RIV) test. 17. Weather ageing test (For polymer housed arresters).	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
b) Surge Counter	
1. Temperature test. 2. Impulse test. 3. Short-circuit test. 4. Salt fog test (For polymeric housed arresters). 5. Shock test. 6. Vibration test. 7. Humidity test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab

[1] Type Test Report as per latest IEC shall also be acceptable for applicable voltage

Transformer & Shunt Reactor Bushings[2]

Scope of Type Test	Approved labs
a) Bushing (IEC 60137)	
1. Dry or wet power-frequency voltage withstand test. 2. Dry lightning impulse voltage withstand test. 3. Dry or wet switching impulse voltage withstand test. 4. Thermal stability test. 5. Temperature rise test. 6. Verification of thermal short-time current withstand. 7. Cantilever load withstand test. 8. Tightness test on liquid-filled, compound-filled and liquid-insulated bushings.	Any lab as per Annex-A

[2]Please refer to the criteria approved separately

Insulators

Scope of Type Test	Approved labs
a) **Disc Insulators (P-8)**	
1. Dry lightning impulse with stand voltage test. 2. Dry power frequency withstand voltage test. 3. Wet power frequency withstand voltage test. 4. Radio influence voltage test. 5. Steep wave front test. 6. Artificial pollution test.	Any lab as per Annexure-A
7. Thermal-mechanical performance test. 8. Power arc test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
b) **Post Insulators**	
1. Mechanical test. 2. Impulse withstand voltage. 3. Power frequency withstand voltage. 4. Radio interference Voltage. 5. Power arc test. 6. Steep wave front test. 7. Artificial pollution test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
Grid Station Hardware	
a) **132 kV, 220 kV, 500 kV Connectors (P-176:2011)**	
1. Electrical Resistance Test. 2. Temperature Rise Test. 3. Ageing/Heat Cycling Test. 4. Short Circuit Test. 5. RIV Test. 6. Corrosion Test. 7. Conductivity Test. 8. Corona Test.	Any lab as per Annex-A

9. Tensile strength Test. 10. Brinell hardness Test. 11. Material composition Test. 12. Tightening Torque Test. 13. Bending Test. 14. Mechanical Elongation Test. 15. Cantilever Test.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
b) Strings (P-187-2010) Suspension & Tension	
1. Resistance test conductor 2. Corona Test 3. Heat Cycle Test	Any lab as per Annex-A
4. Mechanical Test	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
GIS Main Bus	
1. Dielectric Tests. 2. Temperature-rise test. 3. Measurement of the resistance of main circuit. 4. Short time withstand current and peak withstand current tests.	Any lab as per Annex-A
5. Tightness Tests. 6. Tests to prove the strength of enclosures. 7. Tests on partitions.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
GIS Bushings	
1. Dielectric tests. 2. Temperature-rise test.	Any lab as per Annex-A

3. Measurement of the resistance of main circuit. 4. Short time withstand current and peak withstand current tests.	
5. Tightness tests. 6. Radio Interference voltage tests.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab
GIS Switchgear(on one line bay)	
1. Tests to verify the insulation level of the equipment including partial discharge tests and dielectric tests on auxiliary circuits. 2. Tests to prove the temperature rise of any part of the equipment and measurement of resistance of the main circuits. 3. Tests to prove the ability of the main and earthing circuits to carry the rated peak and the rated short-time withstand current. 4. Tests to verify the making and breaking capacity of the included switching devices. 5. Tests to prove the radio interference voltage (RIV) level (if an outdoor bushing exists).	Any lab as per Annex-A
6. Test to prove the satisfactory operation of the included switching devices. 7. Tests to verify the protection of persons against contact with live parts and moving parts. 8. Tests to verify the protection of the equipment against external effects due to weather and atmospheric agents applicable. 9. Tests to assess the effects of arching due to an internal fault. 10. Tests to prove the thermal stability of solid insulation (if applicable). 11. Tests to prove the satisfactory operation at limit temperature. 12. Tests to prove the strength of enclosures.	i. Any Independent lab accredited by ISO/IEC 17025 ii. Any lab as per Annex-A iii. Inspection reports issued by any STL Lab

Apart from above mentioned tests, the following major equipment of GIS shall be type tested in accordance with relevant IEC standards and this policy:

1. CT
2. PT/CVT
3. Circuit Breaker
4. Disconnectors
5. Earthing switch
6. Fast Earthing switch

B. T/Line Material:

Scope of Type Tests	Approved Labs
Conductor	
1. Corona /RIV Test 2. Creep Test 3. Longitudinal Smoothness Test 4. Resistance test of complete conductor 5. Tensile test of complete conductor 6. Stress – Strain Test	Any lab as per Annexure-A
Hardware & Accessories	
1. Corona/ RIV test 2. Power arc test 3. Heat cycle test 4. Resistance test 5. Magnetic loss test 6. Galvanization 7. Resistance to conductor slippage test 8. Mechanical tests	Any lab as per Annexure-A
Spacer Dampers	
1. Corona and RIV Test 2. Simulated Short Circuit Current Test 3. Flexibility test 4. Energy absorbing test 5. Simulated Oscillation Fatigue Test 6. Conical Fatigue Test 7. Characterization of the Elastic and Damping Properties 8. Galvanization 9. Clamp slippage test at Ambient Temp. 10. Bolt Torque Test 11. Electrical Resistance Test 12. Elastomer Tests	Any lab as per Annexure-A

SB-Dampers	
1. Corona and RIV 2. Damper Performance 3. Vertical Fatigue (Damper Fatigue Test) 4. Galvanization 5. Clamp Slippage Test at Ambient Temp. 6. Bolt Torque 7. Attachment of Weights to Messenger Cable 8. Attachment of Clamp to Messenger Cable	Any lab as per Annexure-A
Insulators (160 kN)	
1. Low-frequency dry flashover test 2. Low-frequency wet flashover test 3. Critical Impulse flashover test 4. Radio-Influence Voltage Test 5. Thermal-Mechanical Load Cycle Test 6. Steep Wave Front 7. Power Arc Test 8. Artificial Pollution Performance Test 9. Galvanization 10. Thermal Shock Test 11. Residual-Strength Test 12. Impact Test 13. Cotter Key Test 14. Cement Expansion	Any lab as per Annexure-A
Insulators (80, 100, 120 kN)	
1. Dry lighting impulse test 2. Dry power frequency withstand voltage test 3. Wet power frequency withstand voltage test 4. Thermal mechanical test 5. Corona/RIV test 6. Power arc test 7. Steep wave front test 8. Artificial pollution performance test	Any lab as per Annexure-A