



**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-115/2563 : AUTOMATIC INSULATION ANALYZER

Page 1 of 8

**C3 Schedule of detailed requirement**

**Invitation to Bid No.:**

Item	PEA Material No.	Quantity	Description
1	-	sct(s)	<p><b>Portable insulation analyzer</b>, for field testing of insulation in electrical equipment and apparatus up to 115 kV 50 Hz in live substations e.g. power transformers, bushings etc., and for measurements and calculations of capacitance, power factor, watt loss, current, and voltage; consisting of high voltage test section and control and measuring section; with;</p> <p>Output voltage : up to 12 kV, continuously adjustable Output current : up to 200 mA Capacitance : 0.062 uF, or better Power supply : single-phase, 220 VAC, 50 Hz</p> <p>Complete with</p> <ol style="list-style-type: none"><li>1. Input circuit-breaker</li><li>2. Standard protective device(s)</li><li>3. Automatic interference protection/suppression</li><li>4. Raise-lower voltage control</li><li>5. Resonating inductor for increases current output (if any)</li><li>6. Indication and pilot lamps</li><li>7. Oil test cell, in accordance with ASTM-D 924 or equivalent; with case</li><li>8. Main supply cord and plug</li><li>9. Shielded high-voltage test cable with pothead on both ends</li><li>10. Low-voltage test lead(s)</li><li>11. Safety ground leads and accessories</li><li>12. Cable hook</li><li>13. Instruction books</li><li>14. Other accessories according to manufacturer's design and auxiliary equipment not specified in these specifications, but necessary to complete the sound function</li></ol>
2	-	1 lot	Spare parts for the portable insulation analyzer in item 1 (give detail)
3	-	1 lot	Optional accessories for the portable insulation analyzer in item 1 (give detail)
4	-	1 lot	Training course for PEA's personnel including on-site training for operation and maintenance of the portable insulation analyzer in item 1.
	II		



**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-1 15/25 63 : AUTOMATIC INSULATION ANALYZER

Page 2 of 8

**C3 Schedule of detailed requirement**

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
5	-	set(s)	<p><b>Automatic insulation analyzer</b>, fully automatic, modular and portable design, suitable for field testing of insulation in electrical equipment and apparatus up to 115 kV 50 Hz in live substations e.g. power transformers, circuit breakers, bushings etc., and for measurements and calculations of voltage, current, power factor, dissipation factor, capacitance, inductance, and watt loss; consisting of high voltage test section and control and measuring section, with :</p> <p>Safety standards</p> <ul style="list-style-type: none"> <li>- EMC : IEC 61326-1, or equivalent</li> <li>- safety : IEC 61010-1, or equivalent</li> </ul> <p>Function</p> <ul style="list-style-type: none"> <li>- power transformer : leakage reactance</li> <li>: short circuit impedance</li> <li>: frequency response</li> <li>: excitation current</li> <li>: winding resistance</li> <li>: demagnetization</li> <li>: dynamic load tap change</li> <li>: transformer turn ratio</li> <li>: dissipation factor</li> <li>: insulation capacitance</li> <li>- current transformer : ratio, burden and polarity</li> <li>: winding resistance</li> <li>: voltage withstand</li> <li>: excitation curve</li> <li>: dissipation factor</li> <li>- voltage transformer : ratio, burden and polarity</li> <li>: voltage withstand</li> <li>: dissipation factor</li> </ul> <p>Output voltage</p> <ul style="list-style-type: none"> <li>- AC voltage : 0 to 2,000 V, or better</li> </ul>
	II		



**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-115/2563 : AUTOMATIC INSULATION ANALYZER

Page 3 of 8

**C3 Schedule of detailed requirement**

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			Output current - AC current : 0 to 2,000 A, or better - DC current : 0 to 100 A, or better Maximum output power - AC output power : 0 to 2,500 VA, or better - DC output power : 0 to 1,000 VA, or better Test voltage - AC voltage range : 0 to 2,000 V, or better - AC voltage accuracy : $\leq 0.2\%$ reading $\pm 0.2\%$ full scale Test current - AC current range : 0 to 800 A, or better - DC current range : 0 to 100 A, or better - AC current accuracy : $\leq 0.2\%$ reading $\pm 0.2\%$ full scale - DC current accuracy : $\leq 0.2\%$ reading $\pm 0.2\%$ full scale Test frequency - AC frequency range : 15 Hz to 400 Hz at 0 to 250 V <sub>ac</sub> , or better : 45 Hz to 70 Hz at 0 to 12 kV <sub>ac</sub> , or better Power factor - power factor range : 0 to 100 % - power factor accuracy : $\leq 0.5\%$ reading $\pm 0.02\%$ Dissipation factor - dissipation factor range : 0 to 10,000 % at 300 V to 10 kV, or better - dissipation factor accuracy : $\leq 0.5\%$ reading $\pm 0.02\%$ Capacitance (at 50 Hz) - capacitance range : 1 pF to 3 uF at 300 V to 10 kV, or better - capacitance accuracy : $\leq 0.5\%$ reading $\pm 1$ pF Inductance (at 50 Hz) - inductance range : 10 H to 10 kH at 300 V to 10 kV, or better - inductance accuracy : $\leq 0.5\%$ reading $\pm 1$ mH Control and measuring section : build in LCD display, or better PC communication interface : USB or Ethernet port, completed with communication cable
	II		



**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-115/2563 : AUTOMATIC INSULATION ANALYZER

Page 4 of 8

**C3 Schedule of detailed requirement**

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			<p>Operating temperature : up to 50°C, or better</p> <p>Power supply : single phase 230V, 50Hz</p> <p>Complete with:</p> <ol style="list-style-type: none"><li>1. Serial interface for a accessories device such as tan delta unit</li><li>2. Instruction and maintenance manual, English, shall be contain following information:<ol style="list-style-type: none"><li>a) Operating principle</li><li>b) Operating instruction of test set and user interface software</li><li>c) Setting and adjustments</li><li>d) Maintenance instructions or troubleshooting instruction</li><li>e) Part list and circuit diagram</li></ol></li><li>3. High-voltage supply shielded cable, not less than 18 meters long, with connection clamp</li><li>4. Measuring shielded cables, not less than 18 meters long, with connection clamps</li><li>5. Grounding cable, not less than 6 meters long, with connection clamp and accessories</li><li>6. Power supply and plug</li><li>7. Thermometer and hygrometer for measuring air temperature and humidity</li><li>8. Transport cart and carrying bag or case for the analyzer and accessories</li><li>9. Oil test cell, in accordance with ASTM D924, or equivalent with carrying case</li><li>10. Software package comprising useful function and using on computer with Windows™ operating system for analysis the data from the analyzer and marking reports.</li><li>11. Certificate of calibration</li><li>12. Switchbox</li><li>13. Other accessories according to manufacturer's design and auxiliary equipment necessary to complete the function.</li></ol>
6	-	1 lot	Spare part for the automatic insulation analyzer in item 5 (give detail)
7	- II	1 lot	Optional accessories for the automatic insulation analyzer in item 5 (give detail)





**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-1 15/2563 : AUTOMATIC INSULATION ANALYZER

Page 5 of 8

**C3 Schedule of detailed requirement**

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
8	-	set(s)	<p><b>Automatic insulation analyzer</b>, fully automatic, modular and portable design, suitable for field testing of insulation in electrical equipment and apparatus e.g. transformer, circuit breakers, current transformer, voltage transformer, protection relay, etc., and for measurements and calculations of voltage, current and resistance; consisting of high voltage test section and control and measuring section, with :</p> <p>Safety standards</p> <ul style="list-style-type: none"> <li>- EMC : IEC 61326-1, or equivalent</li> <li>- safety : IEC 61010-1, or equivalent</li> </ul> <p>Output voltage</p> <ul style="list-style-type: none"> <li>- AC voltage : 0 to 2,000 V, or better</li> </ul> <p>Output current</p> <ul style="list-style-type: none"> <li>- AC current : 0 to 2,000 A, or better</li> <li>- DC current : 0 to 100 A, or better</li> </ul> <p>Maximum output power</p> <ul style="list-style-type: none"> <li>- AC output power : 0 to 2,500 VA, or better</li> <li>- DC output power : 0 to 1,000 VA, or better</li> </ul> <p>Test voltage</p> <ul style="list-style-type: none"> <li>- AC voltage range : 0 to 2,000 V, or better</li> <li>- AC voltage accuracy : <math>\leq 0.2\%</math> reading <math>\pm 0.2\%</math> full scale</li> </ul> <p>Test current</p> <ul style="list-style-type: none"> <li>- AC current range : 0 to 800 A, or better</li> <li>- DC current range : 0 to 100 A, or better</li> <li>- AC current accuracy : <math>\leq 0.2\%</math> reading <math>\pm 0.2\%</math> full scale</li> <li>- DC current accuracy : <math>\leq 0.2\%</math> reading <math>\pm 0.2\%</math> full scale</li> </ul> <p>Test frequency</p> <ul style="list-style-type: none"> <li>- AC frequency range : 15 Hz to 400 Hz at 0 to 250 V<sub>ac</sub>, or better : 45 Hz to 70 Hz at 0 to 120 kV<sub>ac</sub>, or better</li> </ul> <p>Control and measuring section : build in LCD display, or better</p> <p>PC communication interface : USB or Ethernet port, completed with communication cable</p> <p>Operating temperature : up to 50°C, or better</p> <p>Power supply : single phase 230V, 50Hz</p>
	II		



**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-I 15/2563 : AUTOMATIC INSULATION ANALYZER

Page 6 of 8

**C3 Schedule of detailed requirement**

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
	II		<p>Complete with</p> <ol style="list-style-type: none"><li>1. Power supply cord and plug</li><li>2. High-voltage supply shielded cable, not less than 18 meters long, with connecting clamp</li><li>3. Measuring shielded cables, not less than 18 meters long, with connection clamp</li><li>4. Transport cart and carrying bag or case for the analyzer and accessories</li><li>5. Ground cable, not less than 6 meters long, with connection clamp and accessories</li><li>6. Instruction and maintenance manual, English, shall be contain following information:<ol style="list-style-type: none"><li>a) Operating principle</li><li>b) Operating instruction of test set and user interface software</li><li>c) Setting and adjustments</li><li>d) Maintenance instructions or troubleshooting instruction</li><li>e) Part list and circuit diagram</li></ol></li><li>7. Software package comprising useful function and using on computer with Windows™ operating system for analysis the data from the analyzer and marking reports.</li><li>8. Laptop computer, with :<ul style="list-style-type: none"><li>- Central Processing Unit (CPU) : intel core i5 up to 2.20 Ghz, or better</li><li>- Memory : 8 GB DDR4, or better</li><li>- Hard disk : not less than 1 TB 5400 RPM + 128 GB SSD</li><li>- Monitor : 15 inch FHD, or better</li><li>- Video memory : not less than 4 GB GDDR5</li> <li>- Power supply : single phase, 230V AC 50Hz and lithium ion rechargeable battery</li><li>- Operation system : windows 7 with window license</li><li>- Network connection : wi-fi, blue-tooth, lan, wireless lan</li><li>- Port and Interface : USB 2.0, USB 3.0 or better, and HDMI</li><li>- Laptop computer complete with<ol style="list-style-type: none"><li>1) Microsoft office 2010 or later edition with Microsoft license</li><li>2) Antivirus software (later edition) with product license</li></ol></li></ul></li></ol>



**PROVINCIAL ELECTRICITY AUTHORITY**  
**TECHNICAL SPECIFICATION DIVISION**

Specification No.: RTES-1 15/2563 : AUTOMATIC INSULATION ANALYZER

Page 7 of 8

**C3 Schedule of detailed requirement**

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			<ul style="list-style-type: none"><li>3) External optical mouse and mouse pad</li><li>4) Flash drive, capacity not less than 64 GB, USB 3.0, or better</li><li>5) Carrying case</li><li>6) Power supply cord and plug</li><li>7) Other accessories according to manufacturer's design and auxiliary equipment necessary to complete the functions</li><li>9. Other accessories according to manufacturer's design and auxiliary equipment necessary to complete the function</li></ul>
9	-	1 lot	Spare part for the automatic insulation analyzer in item 8 (give detail)
10	-	1 lot	Optional accessories for the automatic insulation analyzer in item 8 (give detail)
			<p>Note:</p> <ul style="list-style-type: none"><li>1. The bidders shall be sole distributor or authorized representative and have a permanent office in Thailand; otherwise shall not be accepted.</li><li>2. The bidders have to quote the unit costs.</li><li>3. The bidders have to quote spare parts and optional accessories with their lists of quantities and itemized prices, if any. The prices of spare parts and optional accessories shall not be taken into consideration for the purpose of the bid evaluation; and PEA reserves the right to purchase some or all of items, to adjust their quantities, or to cancel them.</li><li>4. The bidders have to submit the automatic insulation analyzer for demonstration and function checks within five (5) working days after the bid closing date; otherwise shall be rejected. The demonstration and function checks shall be done by the users, i.e. for automatic insulation analyzer the user in the central area is "Substation maintenance division", and shall be done at least following items:<ul style="list-style-type: none"><li>4.1 Visual and/or dimension inspection</li><li>4.2 Function checks tests</li><li>4.3 Operation and/or installation tests</li><li>4.4 Other inspection/test according to users</li></ul></li></ul>
	II		