



PROVINCIAL ELECTRICITY AUTHORITY

POWER SYSTEM STANDARD DIVISION

Specification No.: RTES-169/2552 : Three-Phase Meter Test Station, Up To 20 Meters

Page 1 of 10

C3 Schedule of detailed requirement

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
1	-	system(s)	Three-phase meter test station; automatic certification, semi-automatic adjustment and manual setting of test current, voltage, power factor, and for simultaneously testing the large batches of three-phase energy meters of electromechanical and electronic types of class 0.2, 0.5, 1 and 2; up to twenty (20) units or more at the same time using the energy comparison method; suitable for testing of the following kinds of meters : - three-phase 3-wire and three-phase 4-wire meters for active energy (three-phase kilowatt-hour meters) - three-phase 3-wire and three-phase 4-wire meters for reactive energy, all type of connections (three-phase kilovar-hour meters); each system shall be consisted of: 1.1 <u>1</u> unit Meter test unit, with: <u>1</u> set Electronic power source unit: Main switch and emergency off switch Input voltage : 3x220/380 V, 50 Hz Test frequency circuit : 45 to 65 Hz adjustable in steps of 0.1 Hz Test voltage circuit: - range : 40 to 300 V (phase-neutral). or better - accuracy : ≤ 0.05 % of range, or better - output power : not less than 3x1,000 VA - stability : ≤ 50 ppm/h - distortion factor : < 0.5 % - power efficiency : ≥ 85 % Electronic overload and short-circuit protection Test current circuit: - range : 1 mA to 120 A, or better - accuracy : ≤ 0.05 % of range, or better - output power : not less than 3x1,500 VA - stability : ≤ 50 ppm/h

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Item	PEA Material No.	Quantity	Description
			- distortion factor : $< 0.5 \%$ - power efficiency : $\geq 85 \%$ Electronic overload circuit and security to safeguard the operation at open current circuit Phase angle adjustment: - range : 0° to 360° - resolution of phase angle setting : 0.01°, or better 1 set Electronic reference standard : - Voltage : - range : 60 to 400 V (phase-neutral), or better - accuracy : $\leq \pm 0.01 \%$ of range, or better - Current : - range : 10 mA to 120 A, or better - accuracy : - 10 mA to 100 mA, range : $\leq \pm 0.02 \%$ of range, or better - 100 mA to 120 A, range : $\leq \pm 0.01 \%$ of range, or better - Frequency : - range : 45 to 65 Hz
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Item	PEA Material No.	Quantity	Description
			- Error of active and reactive (power/energy) : - $\cos\phi = 1$: $\leq \pm 0.02$ % of range, or better, - $\cos\phi = 0.5$: $\leq \pm 0.04$ % of range, or better, - $\sin\phi = 1$: $\leq \pm 0.02$ % of range, or better, - $\sin\phi = 0.5$: $\leq \pm 0.04$ % of range, or better, <u>1</u> set. Actual value indicator with digital display (The actual indicator may not be required if the software can show all actual values on 17" LCD monitor separately from display monitor. In this case two(2) monitors shall be required and the values shall be shown on the monitors simultaneously) The following values can be shown: - 3 test voltages U_1, U_2, U_3, - 3 test currents I_1, I_2, I_3, - power per phase P_1, P_2, P_3, - total power - phase angle between voltage/current per phase - frequency 1.2 <u>1</u> lot. The meter test rack, consisting of a rack and table. The rack shall be suitable for the suspension twenty (20) meters.
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Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			1.3 <u>20</u> sets. Test connection of quick connector type for each meter, universal design (for IEC, ANSI and BS meters), adjustable, suitable for bottom-connected of three-phase energy meters of all types in general use in large numbers, used on the meter racks for easy and quick connection of the meter to be tested, with: - current cables - voltage cables with omega clamps and pins - cables for testing emitting pulse contact 1.4 <u>20</u> sets. Scanning device, of photoelectric scanning head/sensor head, suitable for counting disk revolutions of electromechanical type meters and for detecting LED impulses of electronic type meters. Complete with vertical and horizontal adjustment mechanism. 1.5 <u>20</u> sets. Error display units, digital type, for individual error display for each meter under test, mounted on the meter rack at each meter test place, with: - the display is in % - test pulse emitting contacts of meters 1.6 <u>1</u> lot. Current isolation transformers, for simultaneously testing the large batches (up to twenty (20) units or more) of three-phase energy meters with closed links between test voltage and test current circuit. Complete with terminals for easily change connection in case of using current isolation transformers or without current isolation transformers, with: range : 0.5 to 100 A, or better (ratio 1 : 1) accuracy (5 A-100 A) : $\leq \pm 0.1$ % (ratio error) : $\leq \pm 2$ minute (phase error)
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Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			1.7 ____ 1 ____ set. Hand-held terminal, for entering of individual meter data (e.g. register readings, serial numbers, etc.) with LASER SCANNER to read bar-code information from meter. Complete with: 1) Protective devices for input and output circuits and for auxiliary supply circuit(s). 2) Power supply cord and plug. 3) Internal wirings, interconnection cables and connectors. 4) Instruction manual with part list and circuit diagram. 5) Training course, for at least five (5) working days of PEA's personnel, including training for operation and maintenance of the three-phase meter test station, 6) Certificate of calibration and calibration test report of reference standard meter unit from Accreditation Bodies (PTB, NPL, NIST, or equivalent) or from the laboratories, which have been accredited by such the Accreditation Bodies. 7) Others according to manufacturer's design, which shall be clearly described.
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Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			1.8 <u>1</u> set. Microcomputer (Desktop PC), for single-phase 220 VAC 50 Hz power supply, with : CPU : Intel Core 2 Duo processors 2.8 GHz, 3 MB L2 cache, 1066 MHz FSB, or better, Memory : 2 GB DDR2-RAM, or better Hard disk : 250GB SATA Hard Drive 7200 rpm, or more, CD-ROM drive : DVD-RW drive, super multi drive, double layer, or better, Monitor : LCD 17" (1024x768 Res.), or more Keyboard : 104 keys, or more Mouse : PS/2 or USB mouse Network adapter : built-in Ethernet card 10/100 Mbps Multimedia : sound card and speakers of not less than 120 W (P.M.P.O.), Port & Slot : parallel & serial ports, mouse & keyboard ports, audio port and USB port, Complete with: 1) Software package(s), for installation and operation (Microsoft Windows XP/Vista, or later version, Thai Edition). 2) Software package(s), for automatic testing, semi-automatic testing, manual testing and recording data results. 3) Interconnecting cables, power supply cord and plug. 4) Interconnecting cables between the three-phase meter test station (1.1) and the computer system (1.8). 5) Laser printer, 600 x 600 dpi, 10 ppm, paper sizes A4, or better. 6) Desk and chair, for personal computer system. 7) Instruction manual. 8) Others according to manufacturer's design, which shall be clearly described
	II		

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Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			1.9 <u>1</u> set. Uninterruptible power supply (UPS), for single-phase 220 VAC 50 Hz power supply, with: Standard : TIS 1291 System : true on-line Rated power : not less than 500 VA Input voltage : 220 VAC $\pm$ 10 % or better Input frequency : 50 Hz $\pm$ 2 % or better Output voltage : 220 VAC $\pm$ 1 % or better Output frequency : 50 Hz $\pm$ 1 % or better Wave form : sine wave Total harmonic distortion : not more than 5 % Overload capacity : not less than 125 % for 30 seconds Battery type : sealed lead acid (maintenance free) Back-up time (full load) : not less than 10 minutes Noise : not more than 50 dBA at 1 m distance Alarm or Indicator : - low battery - inverter failure - overload Operating temperature : 0^o to 40^o C, or better Complete with: 1) Interconnecting cables, power supply cord and plug. 2) Instruction manual. 3) Others according to manufacturer's design, which shall be clearly described.
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C3 Schedule of detailed requirement

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			1.10 _____ 1 set. Surge protective device, voltage limiting type, for install at the input of a power supply line from lightning protection zone 1 into lightning protection zone 2 (LPZ1 into LPZ2, according to IEC 62305), such as the subdistribution board of the building, with: Test standard : IEC 61643-1 class II (E DIN VDE 0675-6 and E DIN VDE 0675-6/A1, class C), or equivalent Number of pole : 4 units of single pole combination Maximum continuous operating voltage, U_c (operating frequency 50 Hz) : not less than 250 V / pole Nominal discharge current, I_n : not less than 15 kA / pole (8/20) μs Maximum discharge current, I_{max} : not less than 40 kA / pole (8/20) μs Voltage protection level, U_p (L-PE) : not more than 1.5 kV Response time : not more than 25 ns Degree of protection : IP 20, or better Operating temperature range : up to 80 °C, or better Conductor size : 4 - 25 mm², or better Installation : mounting on standard size rail Complete with status indicator, installation equipment, back up fuses or circuit breaker, installation manual and other accessories according to manufacturer's design and auxiliary equipment necessary to complete.
2	-	lot(s)	Spare part, for ten-year operation of the three-phase meter test station in Item 1 (Give details).
3	-	lot(s)	Special tools, for installation and maintenance of the three-phase meter test station in Item 1 (Give details).
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Item	PEA Material No.	Quantity	Description
4	-	lot(s)	Optional accessories for Item 1. Note: 1. Bidders have to quote the Unit Costs; and portion of each Item shall not be considered. 2. The manufacturer of meter test unit shall have at least ten (10) years manufacturing experience and at least one (1) unit of same model and same accuracy class of the proposed meter test unit has been supplied in the last five (5) years. 3. Bidders have to submit documents in English and/or Thai with the bid as follows : 3.1 Certificate of calibration and calibration test report of meter test unit having same model and same accuracy class as the proposed meter test unit from Accreditation Bodies (PTB, NPL, NIST, or equivalent) or from the laboratories, which have been accredited by such the Accreditation Bodies. 3.2 Certification letter from customer that documents his satisfaction of meter test unit having same model and same accuracy class as the proposed meter test unit. 3.3 Sufficient references describing the previous experience of the suppliers (e.g. list of supply of equipment and/or materials having the same or similar design as proposed, field experience, the registration of TISI, the copies of license, and/or the inspection to supplier's factory by PEA's inspectors, etc.) to the satisfaction of PEA. 4. Bidders have to quote recommended spare parts, special tools and optional accessories with their lists of quantities and itemized prices, if any; PEA reserves the right to purchase some or all of items, to adjust their quantities, or to cancel them. 5. Evaluation and comparison of bid price shall not include the spare part, special tools and optional accessories.



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Item	PEA Material No.	Quantity	Description
			6. PEA shall purchase the three-phase meter test station, spare parts in Item 2, special tools in Item 3 and optional accessories in Item 4 from one (1) bidder or one (1) manufacturer. 7. The three-phase meter test station shall be furnished with auxiliary equipment and accessories not specified in these specifications, but necessary to complete the sound function.
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C4 Price schedule

Invitation to Bid No.

Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	-		Three-phase meter test station; automatic certification, semi-automatic adjustment and manual setting of test current, voltage, power factor, and for simultaneously testing the large batches of three-phase energy meters of electromechanical and electronic types of class 0.2, 0.5, 1 and 2; up to twenty (20) units or more at the same time using the energy comparison method; suitable for testing of the following kinds of meters : - three-phase 3-wire and three-phase 4-wire meters for active energy (three-phase kilowatt-hour meters) - three-phase 3-wire and three-phase 4-wire meters for reactive energy, all type of connections (three-phase kilovar-hour meters); each system shall be consisted of:	system(s)		
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C4 Price schedule

Invitation to Bid No.

Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			1.1 Meter test unit, with: Electronic power source unit: Main switch and emergency off switch Input voltage : Test frequency circuit : Test voltage circuit: - range : - accuracy : - output power : - stability : - distortion factor : - power efficiency : Electronic overload and short-circuit protection	1 unit 1 set		
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C4 Price schedule

Invitation to Bid No.

Manufacturer :

Country of origin :

Trade-mark :

Item

**PEA
Material
No.**

**Catalogue
No.**

Description

Quantity

**Unit Cost
(See details
& conditions
attached)**

**Total Cost
(See details
& conditions
attached)**

Test current circuit:

- range :
- accuracy :
- output power :
- stability :
- distortion factor :
- power efficiency :

Electronic overload circuit and security to safeguard the operation at
open current circuit

Phase angle adjustment:

- range :
- resolution of phase angle setting :

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C4 Price schedule

Invitation to Bid No.

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			Electronic reference standard : - Voltage : - range : - accuracy : - Current : - range : - accuracy : - 10 mA to 100 mA, range : - 100 mA to 120 A, range : - Frequency : - range :	1 set		
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C4 Price schedule

Invitation to Bid No.

Manufacturer :

Country of origin :

Trade-mark :

Item

**PEA
Material
No.**

**Catalogue
No.**

Description

Quantity

**Unit Cost
(See details
& conditions
attached)**

**Total Cost
(See details
& conditions
attached)**

- Error of active and reactive (power/energy) :

- $\cos\phi = 1$

:

- $\cos\phi = 0.5$

:

- $\sin\phi = 1$

:

- $\sin\phi = 0.5$

:

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C4 Price schedule

Invitation to Bid No.

Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			Actual value indicator with digital display (The actual indicator may not be required if the software can show all actual values on 17" LCD monitor separately from display monitor. In this case two(2) monitors shall be required and the values shall be shown on the monitors simultaneously) The following values can be shown: - 3 test voltages U_1, U_2, U_3 - 3 test currents I_1, I_2, I_3 - power per phase P_1, P_2, P_3 - total power - phase angle between voltage/current per phase - frequency 1.2 The meter test rack, consisting of a rack and table. The rack shall be suitable for the suspension twenty (20) meters.	1 set		
	II			1 lot		

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C4 Price schedule

Invitation to Bid No.

Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			1.3 Test connection of quick connector type for each meter, universal design (for IEC, ANSI and BS meters), adjustable, suitable for bottom-connected of three-phase energy meters of all types in general use in large numbers, used on the meter racks for easy and quick connection of the meter to be tested, with: - current cables - voltage cables with omega clamps and pins - cables for testing emitting pulse contact	20 sets		
	II		1.4 Scanning device, of photoelectric scanning head/sensor head, suitable for counting disk revolutions of electromechanical type meters and for detecting LED impulses of electronic type meters. Complete with vertical and horizontal adjustment mechanism.	20 sets		

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Manufacturer :

Country of origin :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			1.5 Error display units, digital type, for individual error display for each meter under test, mounted on the meter rack at each meter test place, with: - the display is in % - test pulse emitting contacts of meters	20 sets		
	II		1.6 Current isolation transformers, for simultaneously testing the large batches (up to twenty (20) units or more) of three-phase energy meters with closed links between test voltage and test current circuit. Complete with terminals for easily change connection in case of using current isolation transformers or without current isolation transformers, with: range : accuracy (5 A-100 A) : :	1 lot		



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Invitation to Bid No.

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			1.7 Hand-held terminal, for entering of individual meter data (e.g. register readings, serial numbers, etc.) with LASER SCANNER to read bar-code information from meter. Complete with: 1) 2) 3) 4) 5) 6) 7)	1 set		
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C4 Price schedule

Invitation to Bid No.

Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			1.8 Microcomputer (Desktop PC), for single-phase 220 VAC 50 Hz power supply, with : CPU : Memory : Hard disk : CD-ROM drive : Monitor : Keyboard : Mouse : Network adapter : Multimedia : Port & Slot :	1 set		
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C4 Price schedule

Invitation to Bid No.

Manufacturer :

Country of origin :

Trade-mark :

PEA

Material
No.

Catalogue
No.

Description

Quantity

Unit Cost
(See details
& conditions
attached)

Total Cost
(See details
& conditions
attached)

Complete with:

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

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Invitation to Bid No.

Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			1.9 Uninterruptible power supply (UPS), for single-phase 220 VAC 50 Hz power supply, with: Standard : System : Rated power : Input voltage : Input frequency : Output voltage : Output frequency : Wave form : Total harmonic distortion : Overload capacity : Battery type : Back-up time (full load) : Noise :	1 set		
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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			Alarm or Indicator :			
						
						
			Operating temperature :			
			Complete with:			
			1)			
			2)			
			3)			
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Manufacturer : Country of origin : Trade-mark :			Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
Item	PEA Material No.	Catalogue No.	Description	Quantity
			1.10 Surge protective device, voltage limiting type, for install at the input of a power supply line from lightning protection zone 1 into lightning protection zone 2 (LPZ1 into LPZ2, according to IEC 62305), such as the subdistribution board of the building, with: Test standard : Number of pole : Maximum continuous operating voltage, U_c (operating frequency 50 Hz) : Nominal discharge current, I_n : (8/20) μs : Maximum discharge current, I_{nmax} : (8/20) μs :	1 set
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Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			Voltage protection level, U _p (L-PE) Response time Degree of protection Operating temperature range Conductor size installation Complete with : 1) 2) 3) 4) 5)			
	II			Total of Item 1		

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Manufacturer :
Country of origin :
Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
2	-		Spare part, for ten-year operation of the three-phase meter test station in Item 1 (Give details). 1) 2) 3)	lot(s)		
3	-		Special tools, for installation and maintenance of the three-phase meter test station in Item 1 (Give details). 1) 2) 3)	lot(s)		
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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
4	-		Optional accessories for Item 1. 1) 2) 3) 4) 5)	lot(s)		
	II					



การไฟฟ้าส่วนภูมิภาค

บันทึก

จาก กมฟ. (คทท) บม(ฝ) 346/2551 ถึง ผมก.
เลขที่ คทท (ขฟ) ๕1/3208/2552 วันที่ 28 ก.ย. 2552
เรื่อง ขออนุมัติปรับปรุงสเปค Three-Phase Meter Test Station, Up To 20 Meters
อ้างอิง _____

เรียน อ.ผ.มก.

1. เรื่องเดิม

- 1.1 ตามอนุมัติ ผวก. ลว. 21 ต.ค. 2551 ยกเลิกการจัดซื้อ Three-phase meter test station, up to 20 meter (รายการที่ 4) เนื่องจากมีผู้เสนอราคาที่มีรายละเอียดถูกต้องตามสเปคของ กฟภ. เพียงรายเดียว และยกเลิกการจัดซื้อ CT excitation ratio and polarity test (รายการที่ 11) เนื่องจากไม่มีผู้เสนอราคาที่มีรายละเอียดถูกต้องตามสเปคของ กฟภ. โดยให้ กมฟ. พิจารณาตามความเหมาะสมของสเปคก่อนที่จะดำเนินการจัดซื้อใหม่
- 1.2 ตามบันทึก กบท.(ชก) เลขที่ บม(ฝ) 346/2551 ลว. 7 ม.ค. 2552 ให้ กมฟ. พิจารณาความเหมาะสมของสเปคเครื่องทดสอบ TOU มิเตอร์ (Three-phase meter test station, up to 20 meters) รายการที่ 4 และ CT excitation ratio and polarity test รายการที่ 11 ให้ กมต. ตามอนุมัติ ดังกล่าวข้างต้น

2. การตรวจสอบ

กมฟ. ได้ตรวจสอบแล้ว ดังนี้ :

- 2.1 กฟภ. มีสเปค Three-phase meter test station, up to 20 meters (รายการที่ 4) แล้วเป็นสเปคอ้างอิงเลขที่ R-999/2545 แต่มีรายละเอียดไม่สอดคล้องกับผลิตภัณฑ์ที่มีจำหน่ายอยู่ในท้องตลาดในปัจจุบัน
- 2.2 ปัจจุบันยังมีผู้แทนจำหน่ายผลิตภัณฑ์ CT excitation ratio and polarity test (รายการที่ 11) ที่มีรายละเอียดสอดคล้องกับสเปคของ กฟภ. ตามสเปคอ้างอิงเลขที่ R-683/2538 จำนวน 2 ผลิตภัณฑ์ แต่ไม่ได้เข้าร่วมเสนอราคา และได้แจ้งให้ กบท.(ชก) ทราบแล้ว ตามบันทึก กมฟ. เลขที่ มฟ.(ขฟ) 51/3208/2552 ลว. 21 ม.ค. 2552 (เอกสารแนบ 1)

3. การปรับปรุงสเปค

กมฟ. ได้ปรับปรุงสเปค Three-phase meter test station, up to 20 meters ดังกล่าวเสร็จเรียบร้อยแล้ว เป็นสเปคอ้างอิงเลขที่ RTES-169/2552 โดยมีรายละเอียดสอดคล้องตามความต้องการของ กมต. (ผู้ใช้งาน) แล้ว ตามบันทึก กมต. ลว. 7 เม.ย. 2552 มีรายละเอียดที่ได้ปรับปรุงใหม่สรุปได้ดังนี้ :

การไฟฟ้าส่วนภูมิภาค

สเปกเก่า (R-999/2545)	สเปกปรับปรุงใหม่ (RTES-169/2552)	ข้อพิจารณาและเหตุผล
Electronic reference standard : - Current : - range : 10 mA to 120 A, or better - accuracy : - 10 mA to 120 A, range : $\leq \pm 0.01 \%$	Electronic reference standard : - Current : - range : 10 mA to 120 A, or better - accuracy : - 10 mA to 100 mA, range: $\leq \pm 0.02 \%$ of range, or better - 100 mA to 120 A, range : $\leq \pm 0.01 \%$ of range, or better	เพื่อให้สอดคล้องกับผลิตภัณฑ์ที่มีจำหน่ายในท้องตลาด และผลิตภัณฑ์ที่สามารถเสนอราคาได้หลายราย
Actual value indicator with digital display. The following values can be shown: - 3 test voltages U_1, U_2, U_3 - 3 test currents I_1, I_2, I_3 - power per phase P_1, P_2, P_3 - total power - phase angle between voltage/current per phase - frequency	Actual value indicator with digital display (The actual indicator may not be required if the software can show all actual values on 17" LCD monitor separately from display monitor. In this case two(2) monitors shall be required and the values shall be shown on the monitors simultaneously) The following values can be shown: - 3 test voltages U_1, U_2, U_3 - 3 test currents I_1, I_2, I_3 - power per phase P_1, P_2, P_3 - total power - phase angle between voltage/current per phase - frequency	ตามบันทึก กมต. ลว. 7 เม.ย. 2552

4. ข้อเสนอแนะ

กมฟ. เห็นสมควรใช้สเปคอ้างอิงเลขที่ RTES-169/2552 : Three-phase meter test station, up to 20 meters ที่ได้ปรับปรุงใหม่ดังกล่าวข้างต้นในการจัดหาต่อไป

อนึ่ง เท่าที่ กมฟ. ตรวจสอบได้ขณะนี้ มีผลิตภัณฑ์ที่มีรายละเอียดสอดคล้องตาม สเปกดังกล่าว 2 ผลิตภัณฑ์ คือ :

1. ผลิตภัณฑ์ ZERA ประเทศ Germany
2. ผลิตภัณฑ์ MTE Meter Test Equipment ประเทศ Germany

โดยผู้แทนของบริษัทฯ ผู้ผลิตอุปกรณ์ดังกล่าว คือ

1. บริษัท แอมพ์ทรอน อินสทรูमेंทส์ (ประเทศไทย) จำกัด
2. บริษัท ยูนิเพาเวอร์ เอ็นยีเนียริง จำกัด

ได้เห็นชอบสเปกดังกล่าวแล้ว ตามบันทึกประชาพิจารณ์ฯ ลว. 16 พ.ค. 2552 และ ลว. 22 พ.ค. 2552

ทั้งนี้คาดว่าจะมีผู้เสนอราคาได้หลายราย และมีผลิตภัณฑ์อื่น ๆ สามารถเสนอราคาได้ด้วย

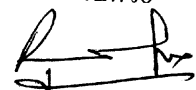
จึงเรียนมาเพื่อโปรดพิจารณา พร้อมนี้ได้แนบสเปค ตารางเปรียบเทียบ และเรื่องเดิมมาเพื่อประกอบการพิจารณาด้วยแล้ว

กม ทองเปี่ยม

(นายถาวร ทองเปี่ยม)
ผู้อำนวยการกองมาตรฐานระบบไฟฟ้า

เรียน ผชช.12

เพื่อโปรดพิจารณา หากเห็นชอบ
ขอได้โปรดนำเรียน รผค.(ว) อนุมัติตาม
กมฟ. เสนอ ต่อไปด้วย



(นายอนุสรณ์ เกตุคำ)

นายอนุสรณ์ เกตุคำ

กม 2

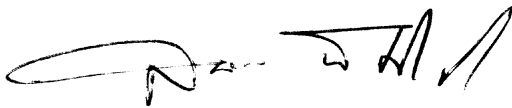
๒๒ ก.ย. ๒๕๕๒

เรียน รผก.(ว)

พชช.12 พิจารณาแล้ว เห็นควรขออนุมัติปรับปรุง

สเปค Three-Phase Meter Test Station, Up to 20 Meters
ใช้ตรวจสอบความเที่ยงตรงของมิเตอร์ 3 เฟส แบบจานหมุน
และแบบอิเล็กทรอนิกส์ class 0.2, 0.5, 1 และ 2 เป็นมิเตอร์
วัดพลังงานจริง หรือพลังงานรีแอกทีฟในระบบ 3 เฟส 3 สาย
หรือ 4 สาย ประกอบด้วย (1) Meter test unit (2) Meter
test rack (3) Test connection of quick connector type for
each meter (4) Scanning device (5) Error display unit
(6) Current isolation transformer (7) Hand held terminal
(8) Microcomputer (9) Uninterruptible power supply (UPS)
(10) Surge protective device

จึงเรียนมาเพื่อโปรดพิจารณาอนุมัติสเปคดังกล่าวข้างต้น
ตาม กมฟ. ผมก. เสนอ ต่อไป

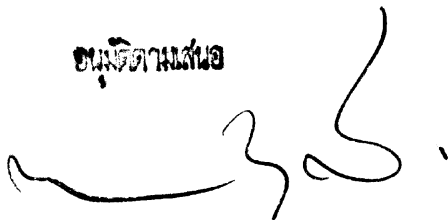


(นายศักดิ์ จิตตงคาริน)

ผอ. ระดับ 12

29 ก.ย. 2552

อนุมัติตามเสนอ



(นายพงศ์กร ตันตวิมลใจจันทร์)

รองผู้อำนวยการวางแผนและพัฒนาระบบไฟฟ้า

29 ก.ย. 2552

กมฟ.



30 ก.ย. 2552

กมฟ.

กม

30 ก.ย. 2552

คุณฉัตรพงษ์

6000 (11กม)

1 ต.ค. 2552