



TERMS OF REFERENCE

Supply and Delivery of Various Meteorological Instruments

1.0 Overview

PAGASA as official weather bureau, we have various synoptic and agromet stations all over the Philippines that takes daily weather observation and gives weather report. Different kind of Meteorological instruments are used to do the tasks. It measures temperature, humidity, atmospheric pressure, wind and rain.

Many years passed since PAGASA purchased an instruments used at field stations and by now it's become old and dilapidated that needs to be replaced and upgrade to have an accurate and reliable weather instruments that meet the prescribed standard specifications and accuracy set by the WMO for meteorological instruments.

2.0 Approved Budget for the Contract (ABC)

The approved Budget for the Contract is **Eleven Million Nine Hundred Ninety Thousand Pesos (Php11,990,000.00)** inclusive of VAT and all applicable government taxes.

3.0 Qualifications of Manufacturer and Bidder

3.1 Bidder should at least have a minimum experience of three (3) years in the supply of meteorological instruments/equipment in the Philippines. They should submit proof of acceptance of similar completed projects.

3.2 Manufacturer should be ISO 9001:2015 Certified.

4.0 Bid Proposal Contents

Bidder shall respond paragraph by paragraph to all the specifications and shall clearly indicate compliance. The bidder should include in this proposal descriptive literature of the meteorological instruments/equipment to be supplied in original format. They should include brochures of the instrument, manual and others. These details shall permit PAGASA to fully evaluate the various meteorological instruments/equipment.

5.0 Bid Validity

The bid shall remain valid for a period of 120 days from the date of bid.

6.0 Place and Date of Delivery

6.1 Delivery Schedule

The winning bidder shall **supply and deliver various meteorological instruments/equipment** to the PAGASA Central Office **within ninety (90) calendar days** upon receipt of the notice to proceed.

6.2 System Documentation

The successful bidder must supply manuals on installation, operation, maintenance of meteorological instruments/equipment. These manuals shall include factory test and calibration data results. All documentation shall be written in English.

6.3 Calibration Test

- Before acceptance, all instruments shall be tested and calibrated at the Calibration Unit of PAGASA. Instruments found with accuracy not within what is set forth in the specification shall be replaced.
- The winning bidder shall provide documentary proof of calibration from the PAGASA Instrument Calibration Laboratory on the delivered sensors.

7.0 Warranty

All workmanship, materials and meteorological instruments/equipment shall be warranted by the winning bidder for two (2) years upon acceptance. The whole set of units that fail to provide satisfactory performance during this warranty period shall be replaced **within 30 calendar days** from the date of notification at the winning bidder's expense.

8.0 Technical Specifications

Instrument	Specification	Quantity
Wind speed and direction sensor	<p>Range: wind speed: 0 to 90m/sec., wind direction: 0 to 360°</p> <p>Accuracy: ± 0.5 for wind speed and $\pm 5^\circ$ m/s wind direction</p> <p>Power: 12 ± 2 VDC supplied from the indicator</p> <p>With 50 meters' cable each to connect sensor and digital indicator</p> <p>Suitable for calibration</p>	7 sets
Digital wind speed and direction indicator with alarm	<p>Range: 0 to 360° for wind direction and 0 to 99.9 m/s for wind speed</p> <p>Display content: Instantaneous or mean wind direction and speed with English indicator in digital figures</p> <p>Power: 220 VAC, 50 or 60 HZ</p> <p>Alarm: up to 3 level</p> <p>With one unit each of uninterruptible power supply (UPS) back up for long-time use, 240V, 50-60HZ</p> <p>With English instruction manual</p> <p>Suitable for calibration</p>	
Tipping bucket rainfall sensor	<p>Orifice: \varnothing 200 mm</p> <p>Dimension: \varnothing200 - 220 x 450(H)</p> <p>Output: 0.5mm amount of rainfall per tip</p> <p>Contact: Reed switch</p> <p>Contact time: 0.1 second</p> <p>Contact capacity: 0.5-1ADC, 30-200VDC</p> <p>Accuracy: ± 0.5mm</p> <p>Material of body: stainless steel</p> <p>With 50 meters cable each to connect sensor and digital indicator</p> <p>Suitable for calibration</p>	10 sets
Digital rainfall indicator with alarm	<p>Display range: 0.0 to 999.9</p> <p>Display: 7-segment, English indicator in digital figures</p> <p>Input signal: Non-voltage make contact</p> <p>One tip of rainfall amount: 0.5mm</p> <p>Contact time: 0.1 secs</p> <p>Alarm output: Time rainfall: 1 to 999mm</p> <p>Power requirement: 220 VAC, 50/60 Hz</p> <p>Back up by built-in battery or one</p>	

	unit each of uninterruptible power supply (UPS) for long time use, 240V, 50- 60HZ With English instruction manual Suitable for calibration	
Assmann Aspiration Psychrometer	Measuring range: 0 to 50°C Dual-tube alcohol filled thermometer Accuracy of thermometer: $\pm 0.2^{\circ}\text{C}$ Scale graduation: 0.2°C Speed of air flow: 3 m/s to 5 m/s Power requirements: 3VDC ("D" size manganese battery x 2) or AC adapter (240VAC, 50/60Hz) Accessories: water supply bottle, dustproof cover, humidity conversion rule, humidity conversion table, 20 wicks, 2 "D" size manganese batteries, AC adapter (240VAC), carrying case to accommodate all accessories and a compact stand Suitable for calibration	10 sets
Barograph Quartz Type	Measuring range: 940 to 1045 hPa Accuracy: ± 1 hPa Chart scale: 1 hPa Drum rotation: 7-day Recording pen: cartridge pen (violet ink) Power: C zinc-carbon battery x2 Accessories: 55 sheets of 7-day chart, cartridge pen, C zinc-carbon battery x2, chart holder Suitable for calibration	10 units
Totalizing Anemometer	3 cups anemometer Display meter: Supertwist LCD, 8 digits Resolution: 1/10 of a unit, Kilometers Max speed: 75 m/hr Speed threshold: 0.4 m/s Cup constant: 597 rev. per kilometer Power source: Single or dual battery (CR 1/2 AA 3V Lithium) Noise immunity: IEC 801 Level 3 Assembled size: 9" – 10" diameter x 15" to 17" tall Suitable for calibration	10 units
Micrometer Hook Gauge	Inscribed Range: 10 cm Max mechanical range: 7.5 cm	10 units

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	<p>Stem major graduations: 10mm (1 cm) Stem minor graduations: 1mm (0.1 cm) Dial major graduations: 0.1 mm Dial minor graduations: 0.02 mm Material: Nickel plated brass Dimensions: Ø 133 mm x 178 mm height All units shall be imported</p>	
Still Well	<p>Material: Stainless steel Size: 3.5" – 4" diameter x 9" height The base is triangular with leveling screws at each corner with small holes that allow water to flow in and out on the still well All units shall be imported</p>	10 units
Field Calibration Device (FCD) for tipping bucket rain gauge	<p>Material Body: synthetic thermoplastic resin (polycarbonate) Nozzle: delrin and nickle silver Vent: stainless steel Adaptor: delrin Capacity: 653ml Nozzle(s): 50mm/hr, 100mm/hr, 200mm/hr, 300mm/hr Carry Case: Robust aluminium with heavy duty foam Suitable for calibration</p>	3 sets