	TECHNICAL SPECIFICATION	Nº:	I-ET-3010.00-5511-760-PPT-001	
BR PETROBRAS	CLIENT: SRGE		SHEET: 1 of 19	
	JOB: TELECOMMUNICATION SPECIALIZED			
	AREA: -			
TIC	TITLE: TOOLS AND INSTRUMÉNTS		INTERNAL	
			OI/CS	

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INDEX OF REVISIONS

REV.	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL ISSUE
A	REVISED WHERE INDICATED

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G
DATE	APR/20/2022	OCT/25/2022			Nº:			
DESIGN	PROJ-US	PROJ-US						
EXECUTION	Y3S7	Y3S7						
CHECK	CY22	CY22						
APPROVAL	X187	X187						

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FORM OWNED TO PETROBRAS N-0381 REV. L

INDEX

1. SUBJECT

1.1. This document defines the technical specification of Telecommunications Tools and Instruments that shall be supplied by CONTRACTOR for PETROBRAS FPSO Unit to guarantee the telecommunications systems maintenance.

2. ABBREVIATIONS

AC	Alternate Current
AIS	Automatic Identification System
CCTV	Closed Circuit Television
CPU	Central Processor Unit
DC	Direct Current
DSC	Digital Selective Calling
DVD-RW	Digital Video Disc Rewritable
EPIRB	Emergency Position Indicating Radio Beacon
HF	High Frequency
MF	Medium Frequency
NBR	Norma Brasileira (Brazilian Standard)
PPE	Personal Protective Equipment
PTZ	Pan, Tilt Zoom
RF	radio frequency
RMS	Root Mean Square
SART	Search and Rescue Transponder
SDXC	Secure Digital Extended Capacity
VHF	Very High Frequency

3. REFERENCE DOCUMENTS, CODES AND STANDARDS

3.1.1. NR-10: Segurança em instalações e serviços em eletricidade.

3.1.2. ABNT NBR 14136/2012: Plugs and socket-outlets for household and similar purposes – Standardization.

3.1.3. IEC 61000: Electromagnetic compatibility (EMC) series - all parts.

4. GENERAL REQUIREMENTS

4.1. All electrical devices must be 220VAC/60Hz compatible and all shall have Brazilian standard 02 (two) or 03 (three) pins power plugs (NBR 14136).

4.2.   All equipment shall be provided preferably with Brazilian Portuguese user manuals, however it will be accepted English user manuals.

4.3.   All instruments shall be supply with a valid calibration certificate.

5.   SCOPE OF SUPPLY - INSTRUMENTS

CONTRACTOR shall supply the instruments described in this technical specification. In case of discontinuity, a similar model with same features shall be presented to PERTOBRAS approval.

5.1.   <u>GENERAL USE INSTRUMENTS</u>

5.1.1.   01 (one) Digital multi-meter model 28 II Ex Intrinsically Safe True RMS Digital Multimeter + TPAK ToolPak™ Magnetic Meter Hanger + carrying case.

5.1.2.   01 (one) Digital multi-meter model Fluke 375 True RMS AC/DC Clamp Meter Manufacturer Fluke with accessories.

5.1.3.   01 (one) IR thermometer model 62max manufacturer fluke.

5.1.4.   01 (one) Digital Thermometer-Hygrometer data logger model 1620A manufacturer Fluke.

5.1.5.   01 (one) AA, AAA, 9V, C and D NiMH Battery charger - Energizer Recharge® Universal Charger + 20(twenty) battery NIMH 1.2V 2.3AH AA from manufacturer Energizer.

5.1.6.   01 (one) Digital camera Sony Cyber Shot W830 20.1 Mega Pixels. Manufacturer Sony + Memory card micro SDXC 64GB Sandisk Extreme.

5.1.7.   01 (one) Notebook with the following requirements:

a.   Processor (CPU): Intel Core i7 or better latest generation;
b.   OS: Microsoft Windows 10 professional x64;
c.   RAM Memory: 16GB DDR4;
d.   Storage: 512 GB internal Solid State Drive (SSD);
e.   Dedicated Video card with minimum of 6GB memory
f.   Network adapter: 802.11ac 2.4/5 GHz wireless;
g.   Monitor: 14" LCD monitor;
h.   I/O Ports: Bluetooth, 3x USB 3.0, 1x USB-C, 1x HDMI, 1x Audio in/out and microphone Port, 01 VGA, micro SD card reader, 1x RJ-45 Gigabit Ethernet – 10/100/1000 Mbps;
i.   Web camera (HD), microphone, speakers keyboard (ABNT2 standard, retro backlight)
j.   Power AC – 100 ~ 240V / 50 ~ 60 Hz with Brazilian standard power line plug
k.   Accessories: DVD-RW (integrated or external), webcam (integrated or external), mouse and laptop case.

5.2. LABELING TOOLS

5.2.1. 01 (one) Label Printer model BMP21-PLUS with hard case; Li-ion Battery; Power adapter, Battery charger, Brazilian power cord, 10(ten) M21-250-595-YL external vinyl tag. Manufacturer Brady

5.2.2. 01 (one) Cables Label Printer model BMP61, hard case; NiMH Battery; Power adapter, Battery charger, Brazilian power cord, USB cord, utility strap, 10 (ten) PTL-32-427, 5(five) M61-R4310.

5.2.3. 01 (one) Stainless steel and aluminum label printer model RhinoTM M1011 Embosser Kit | Dymo. Package Includes M1011 Label Embosser; Horizontal Character Wheel; Reverse Image Character Wheel; Non-Adhesive Aluminum Labels Roll 12 mm x 3.5 m; Non-Adhesive Stainless Steel Labels Roll 12 mm x 5 m; Hard Carry Case; NiMH Battery; Power adapter, Battery charger, Brazilian power cord, USB cord.

5.3. GENERAL RF TEST INSTRUMENTS

5.3.1. 01 (one) Cell Master MT8213E 2MHz to 6GHz, Manufacturer ANRITSU with the following accessories:

    a. Inline Peak Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 dBm;

    b. RF USB Power Sensor, 50 MHz to 6 GHz, +23 dBm;

    c. Microwave Universal USB Power Sensor, 10 MHz to 18 GHz, +20 dBm

    d. RF Power Indicator;

    e. Phase-Stable Test Port Cable 1.5 m, DC to 6 GHz, N(m) to N(f), 50 Ω

    f. High Performance Type N(f), DC to 8 GHz, 50 Ω;

    g. Precision Load, N(m), 42 dB, 6.0 GHz, 50 Ω;

    h. SMA(m) to N(m), DC to 18 GHz, 50 Ω;

    i. SMA(f) to N(m), DC to 18 GHz, 50 Ω;

    j. BNC(f) to N(m), DC to 1.3 GHz, 50 Ω;

    k. N(m) to QMA(f), DC to 6 GHz, 50 Ω;

    l. N(m) to QMA(m), DC to 18 GHz, 50 Ω;

    m. Adapter, DC to 6 GHz, 4.3-10(f) to N(f), 50 Ω;

    n. Adapter, DC to 6 GHz, 4.3-10(m) to N(f), 50 Ω;

    o. 7/16 DIN(f) to N(m), DC to 7.5 GHz, 50 Ω;

    p. 7/16 DIN(m) to N(m), DC to 7.5 GHz, 50 Ω;

    q. N(m) to N(m), DC to 11 GHz, 50 Ω, 90 degrees right angle;

    r. Precision Adapter, N(m) to N(m), DC to 18 GHz, 50 Ω;

    s. Precision Adapter, N(f) to N(f), DC to 18 GHz, 50 Ω;

    t. Attenuator 20 dB, 5 W, DC to 18 GHz, N(m) to N(f);

PETROBRAS (BR logo)

TECHNICAL SPECIFICATION	Nº I-ET-3010.00-5511-760-PPT-001	REV. A
AREA: -		SHEET: 6 of 19
TITLE: TOOLS AND INSTRUMENTS		INTERNAL
		OI/CS

    u. Attenuator 30 dB, 50 W, DC to 8.5 GHz, N(m) to N(f);

    v. Portable Directional Antenna, 200 MHz to 500 MHz, N(f);

    w. 2000-1636-R Antenna Kit;

    x. Transit Case;

    y. Test Port Extension Cable; Armored; 1.5 meters; DC to 6 GHz; N(m) - N(m) 50 Ω;

    z. Coaxial Calibration Kit; Type N(m); DC to 8 GHz.

5.3.2. 01 (one) Wattmeter model 4304A (25Mhz – 1Ghz 5W-500 Watt) manufacturer Bird + hard carrying case.

5.3.3. 02 (Two) RF Coaxial Termination 50ohm with N-connector, model 100-T Series, 100 Watt, Convection-Cooled manufacturer Bird.

5.3.4. 02 (Two) Coaxial attenuator 50ohm with N-connector bi-directional attenuator, model 300-A Series, 6dB 300W Watt, manufacturer Bird.

5.3.5. 02 (Two) RF Coaxial attenuator 50ohm with N-connector bi-directional attenuator, model 300-A Series, 30dB 300W Watt, manufacturer Bird.

5.3.6. 01 (one) Wattmeter model 5000-XT + hard carrying case + following sensors:

a.   Model 5019D – 25MHz to 1000MHz, power range 100mW - 100W;

b.   Model 5014 – 2MHz to 2700MHz, power range 125mW – 1kW;

5.3.7. 02 (two) RF adapter kit with 41 pcs. Including 2 each of: BNC male, BNC female, TNC male, TNC female, SMA male, SMA female, N male, N female, UHF male, UHF female, mini UHF male, mini UHF female, F male, F female, RCA/Phono male, RCA/Phono female adapters, 6 Coupling adapters, 1 Double banana plug, 1 Double binding post and 1 Signal Sampler. Manufacturer POMONA.

5.3.8. 06 (six) N female to N female adaptors.

5.3.9. 02 (two) High quality fully tested Super Flexible Coax ½" Cable Jumper N Male to N Male 5ft with test certificate.

5.3.10. 02 (two) High quality fully tested Super Flexible Coax ½" Cable Jumper N Male to N Male 10ft with test certificate.

5.3.11. 02 (two) High quality fully tested Super Flexible Coax ½" Cable Jumper N Male to N Male 20ft with test certificate.

5.3.12. 01 (one) Variable attenuator with step selector from 0 to 9 dB and 10 to 100 dB, 50W n-female / n-female connectors

5.3.13. 01 (one) Handheld Spectrum Analyzer Model 6G Combo (15MHz-2.7GHz + 4.85-6.1GHz), Touchstone Pro (for Windows) Software, Silicone boot protection, carrying case, Power Limiter. Manufacturer RF Explorer, with the following accessories

   a. 50ohm SMA dummy load,
   b. 60dB SMA attenuator,
   c. 30dB SMA attenuator,
   d. 10dB SMA attenuator,
   e. Near Field Antenna Kit,
   f. 3 (three) SMA male to SMA male semi-rigid cable RG316 50 cm,
   g. 3 (three) SMA male to SMA male semi-rigid cable RG316 20 cm,
   h. SMA male to N female adapter,
   i. SMA female to SMA female adapter,
   j. Directional Coupler ZHDC-10-63-S+ (mini-circuits), carrying case.

5.3.14. 01 (one) Handheld RF signal Generator Model RFE6GEN (24Mhz – 6GHz), carrying case, Silicone boot protection, and accessories. Manufacturer RF Explorer.

5.4.   UHF INSTRUMENTS

5.4.1.   01 (one) UHF signal level meter: Frequency range: 300MHz up to 1GHz.

5.4.2.   01 (one) UHF software License for coverage mapping: Frequency range: 300MHz up to 1GHz.

5.5.   LTE INSTRUMENTS

5.5.1.   01 (one) LTE Drive test software License with the following requirements:

   a. LTE technology
   b. Parallel measurement with up to 4 mobile phones per license
   c. Supports test smartphones, with on-device test capabilities
   d. RF and QoS testing capabilities.

5.5.2.   01 (one) LTE signal meter

   a. Enable to detects and displays available signal strength and bands
   b. Maps the outside frequency environment
   c. Finds strongest signal outdoors
   d. Places outside directional antenna for optimum performance
   e. Maximizes signal booster coverage
   f. Frequency band and channel: 700 MHz LTE (band 28) frequency band.
   g. Accessories:
      i. Antenna

  ii. Battery charger

  iii. Case

5.6. GMDSS TEST INSTRUMENTS

5.6.1. 01 (one) All-in one test box and accessories for VHF/MF/HF DSC radios, EPIRBs and Personal Locator Beacons, NAVTEX receivers, AIS class A and B transponders, AIS transponders, AIS-SARTs, Man Over Board devices and 9 GHz Radar SARTs as laid down in SOLAS convention 74/88 and specified in IMO resolution A.948 and circulars 1040 and 1252. Reference Models: Danphone FUTRONIC MKII; AEROMARINE SRT MRTS-7M.

5.7. NETWORK TEST INSTRUMENTS

5.7.1. 01 (one) OptiView XG OPVXG-PROPLUS Network Analysis Tablet, manufacturer Netscout with the following accessories:

 a. Leather carrying case with extra storage;
 b. AC adapter/charger;
 c. Getting Started Guide;
 d. USB memory stick;
 e. 2 m (6') shielded twisted-pair patch cord;
 f. Internal removable hard drive;
 g. All WLAN Options;
 h. All supported SFP modules.

5.7.2. 02 (two) Netscout Onetouch AT G2 Network Assistant Kit, Manufacturer Netscout with the following accessories:

 a. Li-ion battery;
 b. power supply with regional power plugs;
 c. WireView Cable ID #1-#6;
 d. Inline RJ-45 coupler;
 e. USB 2.0 to Micro USB cable;
 f. 8 G Micro SD card;
 g. Holster;
 h. Accessories pouch;
 i. IntelliTone™ 200 Probe;
 j. Medium Soft Case;
 k. Coupler;
 l. Getting Started Guide;
 m. SFP-1000LX, LX Gig Fiber DDM SFP Transceiver;
 n. SFP-1000SX, SX Gig Fiber DDM SFP Transceiver;
 o. SFP-100FX, 100BASE-FX Fiber DDM SFP Transceiver;

p. Wi-Fi adapter data rate : 802.11a: 6/9/12/24/36/48/54 Mbps, 802.11b: 1/2/5.5/11 Mbps, 802.11g: 6/9/12/24/36/48/54 Mbps, 802.11n (20 MHz): MCS0-23, up to 216 Mbps, 802.11n (40 MHz): MCS0-23, up to 450 Mbps, 802.11ac (80 MHz): MCS0NSS1-MCS9NSS3, up to 1.3 Gbps

q. Wi-Fi adapter operating frequency: 2.412 ~ 2.484 GHz (Industrial Scientific Medical Band), 5.170 ~ 5.825 GHz

r. Wi-Fi security: 64/128-Bit WEP Key, WPA/WPA2 personal, WPA/WPA2 enterprise, 802.1X;

s. External antenna (RP-SMA connector) for locating devices;

t. Holster with shoulder strap;

u. Test Accessory for use with AirCheck G2, LinkRunner G2 or OneTouch AT. G2

5.8.   METALIC NETWORK INTRUMENTS

5.8.1.   01(one) Certifier and Cable Analyzer DSX2-5000QI, Manufacturer Fluke with the following accessories:

a. 01 (one) Versiv Mainframe & Remote;
b. 02 (two) DSX-5000 Cable Analyzer Modules;
c. 02 (two) CertiFiber Quad OLTS Modules;
d. Set of Cat 6A/Class EA Permanent Link Adapters;
e. Set of Cat 6A/Class EA Channel Adapters;
f. 02 (two) Headsets;
g. 02 (two) Handstraps;
h. 02 (two) Shoulder Straps;
i. Carry Case;
j. USB Interface Cable;
k. Versiv Open Source Software CD;
l. 02 (two) AC Chargers;
m. 02 (two) Universal Couplers;
n. USB Video Inspection Probe w/ 4 Tips;
o. 02 (two) Quick Clean Cleaners (1.25/2.50 mm);
p. 02 (two) LC/LC Simplex Adapters;
q. SC/LC EF-Compliant MM TRC Kit 50 µm;
r. SC/LC SM TRC Kit;
s. TRC Carry Case;
t. Integrated Wi-Fi;
u. Statement of Calibration;
v. Getting Started Guides.

5.8.2.   01 (one) Copper qualification tester CableIQ™ Advanced IT Kit CIQ-KIT, Manufactured by Fluke, with:

a. CableIQ main unit with remote adapter;
b. CableIQ Reporter software CD;
c. IntelliTone 200 Digital Probe;
d. Remote IDs #2-7;
e. 02 (two) RJ45-RJ45 patch cord;
f. USB cable;
g. Coax 'F' push-on adapter;
h. 75-ohm coax patch cord;
i. RJ45/11 universal coupler;
j. RJ11-RJ11 patch cord;
k. 04 (four) AA batteries;
l. bag;
m. CIQ-COAX (CableIQ Coax Adapter Kit includes F-connector, BNC and RCA connectors);
n. CIQ-RJA (RJ45/11 Modular Adapter);
o. CIQ-SPKR (CableIQ Speaker Wire Adapter).

5.9. OPTICAL NETWORK INTRUMENTS

5.9.1. 01 (one) Optical Fiber Test Kit SimpliFiber® Pro FTK1475, manufactured by Fluke, with:

a. FI-500 FiberInspector Micro – Includes SimpliFiber Pro optical power meter,
b. 850/1300 multimode source,
c. 1310/1550 singlemode source,
d. VisiFault VFL,
e. FI-500 FiberInspector,
f. 02 (two) FindFiber Remote ID sources,
g. Magnetic strap attachments and carrying case;
h. SC, ST, and LC power meter adapters,
i. NFC-KIT-BOX fiber optic cleaning kit.

5.10. PAGA TEST INSTRUMENTS

5.10.1. 01 (one) Impedance meter for PAGA system, model Minirator MR-PRO + 70 V / 100 V manufactured by NTI-audio with Kit, including

a. Minirator MR-PRO
b. 70 V / 100 V Protective Adapter
c. Mains Power Adapter
d. Exel System Case

5.10.2. 01(one) Decibel Meter with the following requirements

    a. Sound pressure level (SPL) meter type 2/ class 2
    b. Measuring range: 30 ... 130 dB
    c. Resolution: 0.1 dB
    d. Accuracy: ±1 dB
    e. Frequency: 20 Hz ... 12.5 kHz
    f. Frequency weighting: A, C,
    g. Memory: Stores up to 100 groups with measuring conditions

5.10.3. 01 (one) XL2 Audio and Acoustic Analyzer + accessories + carrying case XL2 + M2230-WP: microphone. Manufacturer NTI-Audio

5.10.4. 01 (one) Portable Digital Insulation Resistance Tester Mi-2701a, manufactured by Fluke.

5.11.   CCTV TEST INSTRUMENTS

5.11.1. 01 (one) IP CCTV camera test equipment, compatible with the system provided by the CONTRACTOR. The CCTV test instruments provided by the CONTRACTOR must be able to fully configure and test at least: image, PTZ, iris, focus, washer, PoE, wiring, presets and network camera connection.

5.11.2. 01 (one) ANALOGIC CCTV camera test equipment, compatible with the system provided by the CONTRACTOR. The CCTV test instruments provided by the CONTRACTOR must be able to fully configure and test at least: image, PTZ, iris, focus, washer, PoE, wiring, presets and network camera connection.

5.11.3. Reference Model: WSDcam X9, manufacturer WSDcam

5.12.   TELEPHONE TEST INSTRUMENTS

5.12.1. 01 (one) Telephone Test Set Fluke TS54 TDR with the following requirements:

    a. Frequencies: Steady tone: 950 Hz Alternating tones: 950 Hz and 1480 Hz;
    b. Water resistance;
    c. Battery type: 9 V alkaline battery
    d. Belt Clip;
    e. Test Leads with Angled Bed-of-Nails Clips, Piercing Pin Clips & RJ11 Plug
    f. Test Leads with a 4 mm Banana Plug, Alligator Clips, and Test Probe
    g. Head Set

6.   SCOPE OF SUPPLY - TOOLS

CONTRACTOR shall supply the instruments described in this technical specification.

6.1.   SCREWDRIVERS:

All screwdrivers must be made of chrome vanadium steel.

- a.   1/8" x 4" Screwdriver
- b.   3/16" x 4" Screwdriver
- c.   1/4" x 4" Screwdriver
- d.   5/16" x 4" Screwdriver
- e.   3/8" x 6" Screwdriver
- f.   1/8" x 4" PH0 Phillips® Tip Screwdriver
- g.   3/16" x 4" PH1 Phillips® Tip Screwdriver
- h.   1/4" x 4" PH2 Phillips® Tip Screwdriver
- i.   5/16" x 6" PH3 Phillips® Tip Screwdriver
- j.   3/8" x 6" PH4 Phillips® Tip Screwdriver
- k.   3/16" x 1.1/2" Stubby Screwdriver
- l.   5/16" x 2" Stubby Screwdriver
- m. 3/16" x 1.1/2" PH0 Phillips® Tip Stubby Screwdriver
- n.   3/16" x 1.1/2" PH1 Phillips® Tip Stubby Screwdriver
- o.   3/4" x 1.1/2" PH2 Phillips® Tip Stubby Screwdriver
- p.   3/16" x 4" Cabinet Tip Screwdriver
- q.   1/8" x 3" Cabinet Tip Screwdriver

6.2.   PLIERS:

- a.   5-3/4" Curved Jaw Locking Pliers
- b.   8" Slip Joint Pliers
- c.   7" Diagonal Pliers
- d.   8" Lineman Pliers
- e.   8" Long Nose Pliers
- f.   01 (one) Crimping Pliers for Insulated Terminals (Adjustable locking mechanism, made of high carbon steel with glass fiber handle, high accuracy connector crimping pin to moderately press connector on cable wire without damaging the connector).
- g.   8" Wire and Cable Cutting Pliers
- h.   4" Mini Diagonal Pliers
- i.   12" Groove Joint Pliers
- j.   6" Diagonal Pliers

6.3. HEX AND TORX TOOLS

a. SAE Hex Key Fold-up Set (5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32", 1/4")

b. Metric Hex Key Fold-up Set (1.5, 2, 2.5, 3, 4, 5, 6, 8)

c. Torx® Key Fold-up Set (T9, T10, T15, T20, T25, T27, T30, T40)

d. SAE Extra Long Ball Point HexKey Set (1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8")

e. Metric Extra Long Ball Point Hex Key Set (1.5, 2, 2.5, 3, 4, 5, 6, 8, 10)

f. Torx® Tamper Proof Key Set (T10, T15, T20, T25, T27, T30, T40, T45, T50)

6.4. WRENCHES AND SOCKET SETS:

a. Where not mentioned wrenches and socket sets tools must be made of chrome vanadium steel.

b. Metric Double Ratcheting Wrenches set (5.5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 24, 25, 27, 30, 32)

c. SAE Double Ratcheting Wrenches set (5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16", 1", 1-1/16", 1-1/8", 1-1/4")

d. 1/2" Drive 12 Point Metric Socket Set (12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 30, 32 mm) + accessories (Quick-Release Ratchet, Wobble Extensions 5", 10", T-handle, Universal Joint, Speed Handle) + carrying case.

e. 1/2" Drive 12 Point SAE Socket Set (5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1, 1-1/16, 1-1/8, 1-1/4") + accessories (Quick-Release Ratchet, Wobble Extensions 5", 10", T-handle, Universal Joint, Speed Handle) + carrying case

f. 6" Dipping Handle Adjustable Wrench

g. 8" Dipping Handle Adjustable Wrench

h. 12" Dipping Handle Adjustable Wrench

i. Cast Iron 3" Pipe Wrenches

6.5. CARRYING AND STORE

a. 22" x 12.2" x 11.6" metallic toolbox with Padlock

b. 14" Rubber base tools carrying backpack, rugged double wall construction, brathble padded back and straps, reinforced stitching, all metal hardware

c. 14" Soft Sided Tool Bag, Wide Mouth, waterproof rigid base

d. 14" Backpack for tools and notebook. Reference model: Stanley Fatmax Tool Backpack 1-95-611

6.6.   SOLDERING TOOLS

  a. Soldering Iron 220 V 30 W

  b. Soldering Iron 220 V 60 W

  c. Soldering Iron 220 V 200 W

  d. Soldering iron stand

  e. 2000-01 VersaTip™ Precision Butane Torch. Manufacturer Dremel

  f. 250ml Butane gas soldering tool refilling canister with six nozzle types

  g. 0.6mm Solder Wire - Sn60 Pb40 Rosin flux Core 500g

  h. Solder wire stand

  i. Desoldering Braid Wick Solder Remover w/ No Residue Rosin Flux 5 FT

  j. Helping Third Hand Magnifier W/Magnifying Glass Tool

  k. Professional Silicone-Tip Solder Sucker

  l. Rosin Flux Soldering Paste Solder Welding Grease 150g

  m. Magnifier Glass Light Lens with Clamp, Dimmable 1,200 Lumens light, Daylight Spectrum, 5-Diopter, Adjustable Swivel Arm lamp for Desk Table or Workbench

  n. All soldering tools must be stored in a metallic toolbox with Padlock

6.7.   STRUCTURED CABLING TOOLS

  a. Wire Strippers RJ11 & RJ45

  b. 110 IDC punch down insertion tool manufacturer AMP

  c. 19 pcs Network Installation and Repair Kit for RJ45/11/12 Cat5/5e Lan Cable Tester with Remote, Cable Cutter and Co-axial Stripper, Punch Down Krone Insertion Tool and Crimper Pliers in a Case.

  d. Modular Plug Hand Tool with CAT 5e Die + 6 Position Die + 4 Position Die + carrying case

6.8.   MESURING TOOLS

  a. Digital Calipers

  b. 5m Tape Measure

  c. 30m Fiberglass Long Tape

6.9.   CATV AND CCTV TOOLS

  a. Coaxial strippers RG6, RG59 and RG11 for F type connectors

  b. Compact Compression Tools for RG11 F type Coax Cable Connectors

c. Compact Compression Tools for RG6 6 F type Coax Cable Connectors

d. "F" Connector Insertion & Flaring Combo Tool

e. BNC Connector Removal Tools

6.10. LADDERS

a. 3ft fiberglass step ladder with extra-large platform, extended guardrail, 300lb Load Capacity, Type IA Duty Rating, double-riveted slip-resistant steps.

b. 6ft Fiberglass twin step ladder, heavy gauge aluminum extruded top with thick side plates, Slip-resistant steps, extra heavy duty internal aluminum spreaders, Shoe pads riveted, Design for one or two-person jobs, Load Capacity 375lb.

c. 8ft Fiberglass twin step ladder, heavy gauge aluminum extruded top with thick side plates, Slip-resistant steps, extra heavy duty internal aluminum spreaders, Shoe pads riveted, Design for one or two-person jobs, Load Capacity 375lb.

d. 16ft extendable two sections fiberglass step ladder, load Capacity 350lb, 1-1/4in slip-resistant D-rung steps, feet with slip-resistant pad.

6.11. STRIPING AND CUTTING TOOLS AND SAWS

a. Multi-Wire Stripping & Cutting Tools Miller

b. Cable Jacket & Insulation Stripper Miller MK02 Series

c. Snap knife with bimetal blades

d. Hi-Visibility Retractable Knife with bimetal blades

e. Wire Stripper Pliers

f. 12" High-Tension Hacksaw

6.12. ELECTRIC TOOLS

a. Retractable Power Cord Reel with 30m cord and 3 outlets Brazil standard

b. Handheld Heater hot air blower 2000W

c. Bi-Metal Hole Saw set 9 pcs

d. 01 (one) High speed steel drill bit set (1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10mm)

e. 01 (one) Cordless impact drill GSB 18 VE-EC Professional, including case, charger and two batteries. Manufacturer Bosch

f. Screwdriving Bit Set

g. Heavy duty electrician snips

h. Ex flashlight Pelican 3315R-RA with accessories

    i. 4000-6/50 High Performance Rotary Tool Kit + 225-01 Flex Shaft Attachment. Manufacturer Dremel

    j. 8-1/2" Heavy Duty Hot Melt Glue Gun

6.13. OTHER TOOLS

    a. 12 pcs computer repair tool kit

    b. Heavy-Duty Riveter

    c. 8 oz Soft Face Hammer

    d. Tweezers

    e. 5 Pc. 8" File Set

    f. Clamp-on Vise, Throat Depth 1-5/8" (41 mm), Jaw Width 3" (75 mm), Jaw Capacity 2" (50 mm).

    g. Jewelers Precision Screwdriver Set with 6 pcs. (1.4mm Standard, 1.8mm Standard, 2.3mm Standard, 3.0mm Standard, 0pt Phillips®, 1pt Phillips®, Plastic storage case). Hardened and tempered steel blades with blued finish to resist corrosion, Swivel-head handles.

    h. Heavy Duty Raised Floor Panel Lifter dual Suction Cups.

6.14. TOOLS CABINET

    a. Large tool closet cabinet

    b. Doors and structure made of steel

    c. 05 (five) internal drawers

    d. 03 (three) adjustable shelves (capacity: 60 kg each)

    e. Key lock

    f. Minimum cabinet dimensions:

        i. Length: 1200mm
        ii. Width: 500mm
        iii. Height: 1740mm

Figure 1: tool closet cabinet

6.15.   ELECTRONICS BENCH

   6.15.1.   The electronics bench shall have, at minimum, the requirements below:

   a.   Bench covered by anti-static rubber plate (minimum 5mm);

   b.   Bench width: 0.80m

   c.   02 (two) shelves;

   d.   Shelves width: 0.40m

   e.   05 (five) electric outlets (20A) at the bench height;

   f.   02 (two) electric outlets (20A) at each shelf height;

   g.   Light with light switch;

   h.   Independent circuit-breaker at the panel;

   i.   Circuit-breaker at the bench;

   j.   03 (three) lateral drawers;

   k.   Compartments for small materials;

   l.   Bench vise;

   m.   Bench magnifying lamp;

n. Place for welding iron.

o. LCD Monitor Holder;

p. Chair with adjustable height, no arms, footrest, back and seat with cushion.
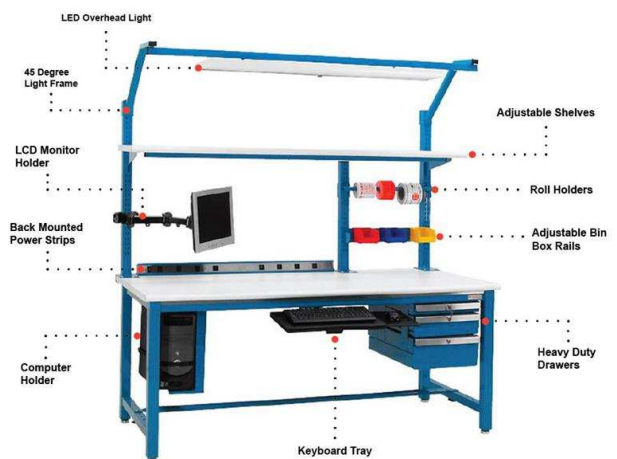
6.15.2. The figures below are only as examples:

Figure 2: electronics bench samples

6.16. PERSONAL PROTECTIVE EQUIPMENT (PPE)

6.16.1. 02 (two) Industrial Safety Belt Five attachment points Full body harness and Lumbar protection cushion.

    a. Material: Polyester, Aluminum, Steel

    b. Certification: EN:813, EN:361& EN:358

    c. Two D-Rings, one on each side, mounted at waist level.

    d. Waist strap and thigh straps equipped with Comfort Pad.

    e. Adjustable Thigh Straps, waist strap and shoulder straps.

    f. Attachable shoulder straps with Karabiner.

    g. Safety harness line (extension belt type)

    h. Twin tail lanyard with integrated energy absorber.

    i. 03 (three) extra D Shape 25kN Aluminum Alloy Autolock Self-Locking Climbing Carabiner.