List of items likely to be procured in the next 3-5 years

Note:

1. This list may change from time to time depending on project requirements.

2. Detailed specifications will be available at the time of raising the indent.

S. No.	Title of Item	Short description
1.	Calorimeter	Manufacturing, assembly, testing and supply of calorimeter with overall height of ~ 2.5m). Involved HTEs (with length of ~400mm) manufactured from CuCrZr and involving EBW welding.
2.	Diagnostic neutral beam Vessel	Manufacturing, assembly, testing and supply of SS rectangular vacuum vessel, size: ~8.5m x 5m x 5m. SIC-1 and RCC-MR class manufacturing with all vacuum boundary weld joints designed for full penetration and 100% volumetrically examinable.
3.	Diagnostic neutral beam DDL	Manufacturing, assembly, testing and supply of Drift Duct Linear with diameter of ~1.2m and length of ~1.2 m. Vacuum brazed copper panels in circular shape, to be installed on the inner size of DD Bellow.
4.	Diagnostic neutral beam PMS	Manufacturing, assembly, testing and supply of Passive Magnetic shield with overall envelop size ~9m x ~5m x 5m for vessel PMS and ~5.4m x 4m x4m for Bushing PMS). Structural component with large number of MS plates (individual plate size ~2m x 5m x 50mmthk), to be assembled with the support structure through fasteners connection.
5.	Diagnostic neutral beam ACCC	Manufacturing, assembly, testing and supply of Copper coil with size ~2.5m x 5m. Uncooled Copper coils, manufactured in rectangular shape
6.	Diagnostic neutral beam Hydraulic lines	Tools required for assembly of injectors
7.	Diagnostic neutral beam Gas feed lines	Hardwares like hydraulic pipes and gas feed lines, electrical interfaces, bellows, RF lines etc
8.	Diagnostic neutral beam Assembly tooling	
9.	Diagnostic neutral beam Interface between High Voltage Bushing and Transmission Line.	Man power supply (Welder, fitter, Fabricator etc) for integration of INTF components

10.	Diagnostic neutral beam Assembly and integration	Manufacturing, assembly, testing and supply. Standard catalogue components
11.	Diagnostic neutral beam Installation and assembly contract	Man power supply (Welder, fitter, Fabricator etc) for integration of INTF components
12.	Diagnostic neutral beam Water cooling systems additional equipments (Pumps, Tank and water)	Manufacturing, assembly, testing and supply. Standard catalogue components
13.	Liquid Nitrogen Distribution System for INTF Cryopumps	Manufacturing, assembly, testing and supply. Standard catalogue components with the line routing as per design
14.	Heating Neutral Beam - 3 Vessel	Manufacturing, assembly, testing and supply of Rectangular vacuum vessel made in two part (Part 1 BLV with size of ~10m x 5m x 5m and Part 2 BSV with size of ~5m x 5.5m x 6m), and then to be integrated through welding at IO site. SIC-1 and RCC-MR class manufacturing with all vacuum boundary weld joints designed for full penetration and 100% volumetrically examinable.
15.	Connecting Duct Linear	Manufacturing, assembly, testing and supply of Connecting duct linear. CuCrZr Panel (size ~3m x 1.8m x 45 mmthk) with deep drilling and EBW
16.	Duct Liner (3 Nos.)	Manufacturing, assembly, testing and supply of Duct linear with overall size of ~ 5m x 2m x 1m. RCC-MR / ASME class manufacturing involving large SS structure and several CuCrZr panels. Tech. like EBW, Exp cladding, high thk welding, Deep drilling etc
17.	Diagnostic neutral beam Exit scraper	Manufacturing, assembly, testing and supply of Exit scraper with overall height of ~2m . To be manufactured from CuOF panels (size of ~1.5m x 1m) involving the deep drilling, ED / brazing and EB welding.
18.	High Voltage Bushing	Manufacturing, assembly, testing and supply of 100kV high voltage bushing with overall diameter of ~1.5m. PIC component, involving metallic and non-metallic materials like large size Ceramic ring (along with its brazing with Kovar), FRP ring (along with its connection with SS), complex assembly of piping, Electrical, RF, Diagnostic feed throughs.
19.	Diagnostic neutral beam Drift Duct Bellow	Manufacturing, assembly, testing and supply Drift Duct bellow, double walled with diameter of ~2m. RCC-MR / EN class double walled large size bellow, with stringent requirements on the movements, manufacturing design,

		welding configurations and fatigue testing requirements
20.	Cryogenic temperature sensors (RTD type - CERNOX and PT-100)	To measure temperature at liquid helium and liquid nitrogen
21.	Temperature sensor (Carbon-Ceramic Type)	to measure temperature Spares as required for cryogenic lab activities. Equivalent product in India is not available
22.	Temperature transmitters	To transmit the temperature values to PLC. Spares as required for cryogenic lab activities. Equivalent product in India is not available
23.	Cryogenic accessories (Tapes etc.)	Special tapes for cryogenic insulation. Product may be available in India now, to be checked.
24.	Mass flow meters (Orifice / Venturi / Coriolis type)	to measure mass flow at cryogenic temperature conditions with flow range (0 to 300 g/s)
25.	Thermal mass flow meter	to measure the gas flow at room temperature conditions (300K)
26.	Control valve positioner	electro pneumatic type to regulate or manipulate the flow of fluids, such as gas through the control valve
27.	Control valve positioner	electro pneumatic type to regulate or manipulate the flow of fluids, such as gas through the control valve
28.	Dewar Level probe and transmitter	superconducting type (to measure liquid helium inside the Dewar and transmit the value to PLC)
29.	Oil separator 1 Level	to measure oil level
30.	Instr. Air Service Unit Pressure	for instrument air service
31.	Vacuum gauge	to measure the vacuum pressure
32.	Pressure transmitter	to measure pressure and transmit the value to PLC
33.	Dewar heater cartridge temperature	to measure heater temperature during liquid helium warm-up
34.	softwares	Simatic manager,CFC, graph, WINCC SCADA, for software development
35.	PLC and its spares	PLC CPU and CP and IO modules for software development
36.	Control valves	bellow sealed control valve (equal percentage type) for helium gas service (in cryogenics temperature).
37.	Vacuum pump and Helium leak detector spare parts	to evacuate the chamber and to find the leak in chamber or system

38.	Multi layer insulation (MLI)	to reduce radiation heat load at cryogenic temperature.
39.	Pressure transmitter	to measure pressure and transmit the value to PLC
40.	Cryocooler (GM type - 2 stage)	For experiments at 4K temperature
41.	Arc-4 with cable	To detect arcs in the RF amplifiers and transmission lines
42.	Cables for IO compatible	To connect different sub-systems with the control and monitoring unit
43.	Solid State Power Amplifier (18 Nos.)	As a pre-driver in RF amplifier chain
44.	3dB Combiner (9Nos.)	To combined 1.5 MW RF outputs from the two RF chains
45.	200kW Dummy Load for 3dB combiner (9Nos)	To absorb the RF power, if any at the isolated port of the 3dB combiner
46.	Fast Controller PC	To use in Local control and monitoring unit
47.	Field Programmable Gate Array based RF measurement & control board development	Development of alternate method for RF measurement & control of an RF source
48.	PLC with I/O board	To use in Local control and monitoring unit
49.	Motor & controller with accessories	To use in RF amplifier & Local control and monitoring unit
50.	SARAL Rack	To use in Local control and monitoring unit
51.	PXI & cRIO system with I/O board	To use in Local control and monitoring unit
52.	Multi core Fiber optic cable	For interfacing Field signal with LCU
53.	RF synthesizer & other RF component	Use as signal source to drive amplifier chain
54.	Cavity components for driver stage amplifier HPA2	Driver amplifier of the RF chain
55.	Co-axial Transmission line components like St. lines, Bends, Gas barriers, Directional Couplers,	Interconnection of various sub-systems of the RF source
56.	Water cooling main header line	Each Rf source has one water cooling main header line
57.	Base Frame, support frame and service platform with ladder	Each RF source has main base frame and support structure
58.	Dual channel RF power meters along with power sensors for each channel	To monitor forward and reflected power of each stage of high power amplifiers in an RF source at ITER-India & IO site
59.	Vector Network Analyser (VNA) Table Top	To measure S parameters of the RF components/Amplifiers in the Lab
60.	Vector Network Analyser (VNA) Hand held	To measure S parameters of the RF components/RF Amplifiers in the field
61.	Spectrum Analyser Table top	To measure Harmonics & Spurious of the RF Amplifiers in the lab
62.	Arbitrary waveform generators	To check the RF performance of the components, drive to RF Amplifiers during performance check in the lab

63.	RF components i.e. low power DL for DC, Attenuators, Phase shifters, RF switches, Power dividers, 1x5 Splitters, 1x2 splitters	to be in RF Sources for measurement, control and monitoring at low power level in each RF chain of amplifiers
64.	Auxiliary DC Power supplies for SG, CG & filament for HPA2 & HPA3 along with additional protection & monitoring circuit for each chain	To bias HPA2 & HPA3 electrodes as per requirement in each RF chain of Amplifiers
65.	LT distribution for RF Source	To provide electrical power for RF source
66.	Electrical Measuring Equipments/Instruments i.e. Digital Oscilloscopes	To be used in measurements of parameters related to power supplies and RF amplifiers
67.	Measurement Links	Measurement of analogue parameters with optical isolation
68.	Transmission Line	Transmission of multiple power lines for few hundred meters
69.	High Voltage Deck	High voltage platform
70.	Signal Conditioning Unit Bins	Signal conditioning units for electrical to optical and optical to electrical digital signal converters-130 channels in one bin
71.	Ion Cyclotron High Voltage Power Supply	High voltage power supply
72.	Electron Cyclotron Main High Voltage Power Supply	High voltage power supply
73.	DIAGNOSTIC NEUTRAL BEAM EGPS	High voltage power supply
74.	200kW RF Generator	1MHz power source
75.	Insulating Transformer	22/6..6kV, 5MVA
76.	Distribution Panel 6.6 KV	6.6kV class vacuum circuit breakers (CBs) switchboards for indoor use with 1 incomer and 4 outgoing configuration with accessories complete including CT, PT, protection relays and instrumentation. Compliance standard ; IEC 612271
77.	Distribution Panel 400V	415V class, air circuit breaker (ACB) and miniature circuit breaker (MCB) Distribution board, floor standing type, indoor use with 2 incomer and 14 outgoing with all accessories. Compliance standard : IEC 61439
78.	Cooling manifold with control & measurement instrumentation	Not available
79.	Aluminium Profile based support structures with Lead shields	Not available
80.	Oil Tank with HV sockets & accessories	Not available
81.	Arc detector system	Not available
82.	RF radiation safety detectors/monitors (170 GHz)	Not available
83.	Design of piping in valve room	Design of piping & supports within valve room with updated requirements
84.	Supply of piping & supports in valve room	Fabrication of piping spools and support structures

85.	AMC for HVAC System HIGH Side- 3 nos chillers	-
86.	AMC for EOT cranes - 5 nos.	-
87.	AMC for Domestic unit- A/C, WC, WD, etc.	-
88.	AMC for FIRE Hydrant System	-
89.	AMC for FIRE Alarm system	-
90.	AMC for Fire Extinguishers	-
91.	AMC for Elevators	-
92.	AMC for Deisel Generator Set	-
93.	HCI Server Hardware	Servers
94.	VM WARE SOFTWARE and other softwares	Software
95.	ROUTERS	Routers
96.	Microsoft softwares	Softwares
97.	Backup Unit	Backup devices
98.	AIO Desktop and laptop	Hardware
99.	Workstations	Hardware
100.	Internet lease line and point to point Lease line	Internet services
101.	AMC of software, servers and application	-
102.	Fire wall	software
103.	VM WARE SOFTWARE and other software	
104.	Three simultaneous wavelength channel High Etendue Spectrometer (HES) (Quantity-Five)	Three simultaneous wavelength channel High Etendue Spectrometer (HES) (Quantity-Five)
105.	CCD/CMOS Detectors for the High Etendue Spectrometer (HES) (Quantity-Fifteen)	CCD/CMOS Detectors for the High Etendue Spectrometer (HES) (Quantity-Fifteen)
106.	Alignment system (used to align the fiber bundle head with the image plane for efficient light coupling)(Quantity-One)	Alignment system (used to align the fiber bundle head with the image plane for efficient light coupling)(Quantity-One)
107.	Optical Fiber bundle Assembly (Compatible with ITER Radiation environment)(Quantity-Five)	Optical Fiber bundle Assembly (Compatible with ITER Radiation environment)(Quantity-Five)
108.	Prototype Radiometer (142 GHz-172 GHz)	1 Receiver of Frequency (GHz): 142- 170 Frequency resolution: 1 GHz Noise Temp: < 5 eV Total no. of channels= 16 (fixed), 2 tuneable channels with bandwidths tuneable between 150-250 MHz for high frequency resolution measurements
109.	Radiometer	4 Receivers of Frequency (GHz): 122-138, 141-168, 172-200, 205-230

		Frequency resolution: 1-2 GHz Noise Temp: <5 eV Total no. of channels= 58 (fixed), 16 tuneable channels with bandwidths tuneable between 150-250 MHz for real time measurement
110.	Fourier Transform Spectrometer	Spectral range: 70 GHz –1000 GHz, Frequency resolution ≤ 5 GHz Linear path scan: ≥ 40 mm Scanning repetition rate: ≤ 20 ms Instrument's Etendue: > 4 x10-5 m2sr Instrument's transmittance for Spectral range 70 GHz – 1000 GHz: ≥ 70 %
111.	Transmission Line including Quasi-optical systems	1.Waveguide sections: Material: Aluminium 6061 T6 Alloy ID: 72 ±0.05 mm, OD: 88±0.5, Inner surface finish: 7.5 micron Ra Ellipticity, WG tube inner surface:< 0.1mm 2. WG couplings: Alignment tolerance ≤ ±0.5 mm Alignment tolerance ≤ 0.04 deg Vacuum seal: Helicoflex seal 3. Miter bends : WG Inner tube diameter: 72 ±0.05 mm WG Outer Diameter (mm): 88±0.5 Waveguide axis bend angle, input port to output port (deg) 90° ± 0.05° Mirror surface alignment to each WG axis: 45° ± 0.04° deg Inner surface finish(Mirror/waveguide): 3-micron Ra/7.5 micron Ra 4. Polarization and Power splitter units - Ellipsoidal and plane mirrors, wire grid polarizer and beam splitters, higher order and cross polarized mode loss > 30 dB
112.	Captive Supports and TL components	Lateral Girder: Qty 3, made of 2 X C-channel, D-UPN100 , welded along the length in three positions by a spacer. Length is 2.7m Material: S335JR-DIN EN10025 2.Clamps, Qty: 15 for DN 150, 12 for OD 88, Material: S335JR-DIN EN10025 3.Vertical support: made of 1 X I-beam, HEB-100, welded to a square plate, and a circular, machined plate on either end, Welds from plates to I-beam are along all edges, Qty: total 6 (2 for each support, Material: S335JR-DIN EN10025, 4.Circular plate with 3 tabs,

		Material: S335JR-DIN EN10025, Welds from tab to plate are along all edges, Qty: 6 5.Tubing: 4 * OD 88 Al6061 tubes-Length: 3000mm, 200 DIN Schedule 40 316LN tubing-length 3000m
113.	Windows	Qty: 8, Clear Aperture: 72mm, Pipe size: 88mm(OD), 72mm (ID), Material: Quartz, Metallic Seal, Thickness: 5.4 mm
114.	Vacuum compatible hybrid photon counting (HPC) detector head, detector electronics, detector controlling unit, thermal stabilization unit and other required accessories to operate the detector unit in vacuum	1. Scope of work: Supply of in vacuum HPC detectors along with accessories .2) No of detector module : 1, Approximate size : 88mm X34 mm, pixel size : > 50mm, Energy range : 2.0 keV to 13 keV, Frame rate : ~500 Hz , Count Rate : ~1X10^7 (photon/s/pixel), Cooling : water cooled detector head along with all other accessories
115.	High quality Quartz and Silicon detectors	1.Scope of work : Supply of high quality spherical crystals 2. Crystal material : Quartz, Interplanar distance (2d) = 4.91304 Angstrom, Crystal cut : (11-20), Radius of curvature : ~1100 mm, Length : 50 mm and Height : 20 mm , Substrate material : BK 7 optical glass
116.	Be window	1.Scope of work : Supply and integration of Be window in an ITER-Style flange 2. Be foil thickness : 200 micron, shape : 40X90 mm, 3. Meshed honey comb SS grids to hold the window 4. Double walled flange assembly.
117.	Single module Pilatus 3 (qty 1)	Single Pilatus3 module, active area ~84mmX34mm, mountable inside HV chamber, pixel size 172 micron, high count rate capability ~ Mcnts/sec, high frame rate 100 fps, high quantum efficiency over 2 - 13 keV. Scope of supply includes detector head, detector electronics, detector server, cooling unit, power supplies, cables and connector, and all standard /optional accessories required for detector operation both in-air and in-vacuum, energy calibration.
118.	Bent crystal (qty 2)	X-ray quality crystal in elliptical configuration curved in a metal frame or optical contacted, high eccentricity ~0.98, length 120mm and height 20mm, material: silicon and germanium, crystal cuts: [111], [422], Scope of supply includes ready to mount

		crystals in a carry case and reports of tests performed
119.	Si detector with MCA (qty 1)	Silicon pin sensor active area ~25 sqmm, energy resolution 120-150 eV, working energy range from 1000 KeV to about 50 KeV, finger length 120mm, Scope of supply includes detector head, digital pulse processor, multi channel analyser, power supply, cables and connector, vacuum feed throughs, all standard/optional accessories and energy calibration.
120.	Fast SDD with MCA (qty 2)	Single drift sensor, active area ~30 sqmm, energy resolution 120-150 eV, working energy range from few 100 eV to about 50 KeV, finger length 120mm, Scope of supply includs detector head, digital pulse processor, multi channel analyser, power supply, cables and connector, vaccum feed throughs, all standard/optional accessories and energy calibration.
121.	Soft X-ray Calibration Source (qty1)	Wattage ~30W, High photon flux output ~100 Gph/sec/steradian, beam size upto 35x40sqmm, Long life filament electron source, multiple selectable targets generating characteristic lines in 0.1 to 10 KeV (materials: Fe, Si, Mn, Ni, Mo, Ti, Zr, Au, Rh, Ru and Sc) on a carousel, CW output, built on DN150 UHV vacuum cross, radiation hard motors, with beam monitoring Scope of supply includes complete X-ray source, filament and HV power supply, power supply and controllers of motorised stages, and control/data acquisition software. Test reports on producing X-rays from target materials are required for acceptance.
122.	TMP station with valves, gauges (qty 2)	Combined assembly of TMP and backing pump with digital controller, Display of vacuum level, vent valve, speed upto 300 l/s
123.	Pure targets (qty 10)	Purity over 99.9%, length 50mm and width 10mm, thickness ~mm, materials: Al, Si, Mn, Ni, Mo, Ti, Zn, Ag, Rh, Pb
124.	X-ray filters (qty 5)	length & width upto 100mm/100 mm diameter, purity over 99.9%, thickens ~few micron, materials: Al, Be, Mo, Ta etc.
125.	Rad-sources (absolutely calibrated))(qty 14)	Disk type, radio nuclides giving photon emission in 0.1 to 50 KeV, Strength ~20 micro curie, uncertainty 5 -10%, avg half life ~ year
126.	Image plate monitor	Digital X-ray film with electronic data readout, 100x100mm active area

127.	Lowe energy prototype	Single spectral channel (MLM/ pathalate) diffracting to a CCD detector, bent crystals in elliptical configuration, 120mm length and 20mm hight, UHV chambers, crystal and detector on a single flange as per ITER spectrometer design. Scope of work/supply includes complete low energy spectrometer supply by down to component level manufacturing design, analysis and drawings, construction, assembly, testing, and delivery to ITER-India
128.	ITER X-ray spectrometer (qty)	Seven spectral channels in two groups: three crystals diffracting photons to hybrid pixel detector and 4 crystals diffracting low energy photons on 3 CCD detectors, bent crystals in elliptical configuration, 120mm length and 20mm hight, UHV chambers, In-line X-ray source for calibration consistency, Neutron-gamma shielding for radiation protection, Plant I&C for control and data acquisition. The spectrometer has 10m long, DN150 sight-tube (consisting two all metal gate valves, axial, gimbal bellow and baking jacket) connecting spectrometer to ITER machine (qualification as per RCC-MR). Scope of work/supply includes down to component level manufacturing design, analysis and drawings, complete spectrometer construction, assembly, testing, absolute intensity calibration of all the channels and delivery to ITER, France
129.	Refurbishment of the Beam Source components and Beam Line Components (RID and Neu) (post utilization at INTF, before supply to ITER as per loan agreement)	Refurbishment of the component (specification will be dependent on the type of refurbishment)
130.	Absolute Valve	The valve has a nominal bore diameter of 1,600 mm, rated to sustain a pressure differential of 0.1 MPa across the plate whilst maintaining a leak rate of less than 1x10-8 Pam3/s
131.	Fast Shutter	A fast shutter (diameter ~1.6m) (opening and closing time 1s) is located downstream of the calorimeter, at the exit of the vessel. The design concept foresees the movement of a door perpendicular to the horizontal axis of

		the vessel. Sealing is provided via a flexible metallic seal. The Primary Vacuum Boundary of the Fast Shutter housing and top flange must have a leak rate better than 10-9 mbarl/s He.
132.	Metal Seal for Vessel	Spring Energised metallic seal of size ~9m x 5m with interspace pumping requirements (designed by Technetics and certified by IO and proprietary)
133.	RF Generator for INTF	200 kW, 1 MHz RFG with automatic frequency tuning facility
134.	Exit scraper	Manufacturing, assembly, testing and supply of Exit scraper with overall height of ~2m . To be manufactured from CuOF panels (size of ~1.5m x 1m) involving the deep drilling, ED / brazing and EB welding.
135.	High Voltage Bushing	Manufacturing, assembly, testing and supply of 100kV high voltage bushing with overall diameter of ~1.5m. PIC component, involving metallic and non-metallic materials like large size Ceramic ring (along with its brazing with Kovar), FRP ring (along with its connection with SS), complex assembly of piping, Electrical, RF, Diagnostic feed throughs.
136.	Drift Duct Bellow	Manufacturing, assembly, testing and supply Drift Duct bellow, double walled with diameter of ~2m. RCC-MR / EN class double walled large size bellow, with stringent requirements on the movements, manufacturing design, welding configurations and fatigue testing requirements
137.	High Power Gyrotron Source Set (1MW of RF power at 170 GHz frequency) ; Qntty 2 sets	High Power Gyrotron Source Set (1MW of RF power at 170 GHz frequency) ; Qntty 2 sets
138.	Specialized Controllers , Instrumentation and power supplies	Specialized Controllers , Instrumentation and power supplies
139.	Temperature sensors (CERNOX and PT-100) Qty. 20	Specifications: Cernox: Measurement Range - 1-300K Accuracy - 4mK at 4.2K Calibration - At each temperature point Annual drift - 20mK (<100K) PT-100: Measurement Range - 14-300K

		Accuracy - 100mK at 77K Calibration - At each temperature point Annual drift - 50mK (>77K) Scope of work: 1. Supply of sensors 2. Supply of Calibration report
140.	Temperature sensor (Carbon-Ceramic)	Specification: Carbon Ceramic: Measurement Range - 1-600K Accuracy - 4mK at 4.2K Calibration - At each temperature point Annual drift - 20mK (<100K) Scope of work: 1. Supply of sensors 2. Supply of calibration reports
141.	Temperature transmitters Qty. 10	Specification: 1. Sensor types: Any cryogenic sensor 2. Output: Fieldbus 3. Accuracy: ~5mK at 4.2K
142.	Cryogenic accessories (Tapes etc.) Qty. 2 set	Should be compatible for operation at cryogenic temperatures with requisite adhesive strength.
143.	Mass flow meters (Orifice / Venturi / Coriolis type) Qty.: 1 of each type	Specification: Quantity to be measured: Volumetric/Mass flow Type: Differential pressure/Frequency Range: 0 to 300 g/s (based on requirement) Operation temperature: 4.2K to 300K Accuracy: <5% of mass flow reading Flow turndown: Better than 10 Scope of work: 1. Supply of mass flow meters according to applicable standards 2. Calibration reports and manuals
144.	Thermal mass flow meter Qty: 2	Specification: Type: Capillary type Accuracy: <1% of mass flow reading

		Range: 0 to 35 g/s (Helium) Scope of work: 1. Supply of mass flow meters 2. Calibration reports and manuals
145.	Control valve controller Qty: 3	Specification: Input: 4-20mA Output: Regulated air pressure for actuator control Local Display: should be available Position feedback: optional Scope of work: 1. Supply of positioner 2. Installation
146.	Dewar Level probe and transmitter Qty: 1	Specifications: 1. Type: Superconducting Type 2. Purpose: Liquid helium level measurement 3. Probe length: Depending on requirement 4. Accuracy: <1% of measured value 5. Output: 4-20mA Scope of work: 1. Supply of probe and transmitter 2. Installation and maintenance manual
147.	Oil separator 1 Level Qty: 3	Model No. or type Description: Bekomat 12 (level Switch) Manufacturer: Bekomat Working pressure (min) in bar:0.8 Working pressure (max) in bar:16 Connection (inlet): 2xG 1/2 Connection (outlet):1xG 3/8 Hose di:10-13 mm Peak compressor Performance (m3/min):8 Type of level sensor: Capacitive
148.	Instr. Air Service Unit Pressure Qty:2	Specifications: 1. Input pressure: 0-20 bara 2. Output pressure: Configurable
149.	Vacuum gauge Qty: 05 Nos.	Specification: 1. Measurement Range: 10(-8) to 1000 mbar 2. Type: Pirani and combination gauge 3. Accuracy: <15% of reading

		4. Output: 0 t0 10V Scope of work: 1. Supply of vacuum gauges 2. Test Certificates
150.	Pressure transmitter Calibration pressure source Qty: 05	Specification: 1. Type: Piezo resistive type 2. Range: 0 to 32 bara 3. Output: 4-20mA 4. Accuracy: 0.1% of reading Scope of work: 1. Supply of pressure transmitters 2. Calibration reports
151.	Dewar heater cartridge temperature	Specification: 1. Type: Thermocouple type 2. Accuracy: 0.5C of reading 3. Installation: Surface mount Scope of work: 1. Supply of sensors 2. Installation
152.	PLC , softwares and other electrical accessories Qty: 01	Specification (software): 1. Software: Simatic Step-7 2. Add on Module: CFC, Graph 3. HMI software: WinCC Scope of work (software): 1. Supply of software and licenses Specification (PLC): 1. PLC CPU: S7-400 series 2. PLC communication module: CP- 443-5 3. Power supply modules 4. AI/AO/DI/DO modules Scope of work (PLC): 1. Supply of hardware in a DIN rail 2. Manuals

153.	Control valves Qty: 05	Specification: 1. Size: As per requirement (DN10 to DN80) 2. End switches 3. Actuator: Single effect (Pneumatic) 4. Bellow sealed 5. Leak rates: 10(-6) mbar-l/s or better Scope of work: 1. Supply of control valves 2. Installation
154.	Vacuum pump and Helium leak detector spare parts Qty: 01	rotary type or turbomolecular (to evacuate the chamber)
155.	Multi layer insulation (MLI) Qty: 01	silver Aluminized mylar (to mitigate the radiation heat load)
156.	Cryocooler (GM type - 2 stage) Qty: 01	Specification: 1. Type: G-M type 2. 2nd stage temperature: 1.5W at 4.2K 3. Compressor and cooling water connectors
157.	Pressure transmitter	Specification: 1. Type: Piezo resistive type 2. Range: 0 to 10 bara 3. Output: 4-20mA 4. Accuracy: 0.1% of reading Scope of work: 1. Supply of pressure transmitters 2. Calibration reports
158.	Arc-4 (4Nos.) with cable (if inhouse arc detector could not perform as per requirement)	Arc 4 with 16 channel, standard item of AFT
159.	Cables for IO compatible (prototype only)	Different categories of cables
160.	SSPA (18 Nos.) (if inhouse developed SSPA could not perform as per requirement)	output power 10kW, 35-65 MHz, Input power 1mW
161.	3dB Combiner (9Nos.) (if inhouse developed 3dB Combiner could not perform as per requirement)	Input power 1.5/1.7MW, Output Power 2.5/3 MW, 35-65 MHz, Fixed.
162.	200kW Dummy Load for 3dB combiner (9Nos)	Power handling 200kW 35-65 MHz
163.	Fast Controller PC	Standard item

164.	PLC with I/O board	As per ITER Organisation catalogue
165.	Motor & controller with accessories (36 sets)	As per ITER Organisation catalogue
166.	SARAL Rack	As per ITER Organisation catalogue
167.	PXI/cRIO system with I/O board	As per ITER Organisation catalogue
168.	Halogen free fire retardant multi core Fiber optic cable	As per ITER Organisation catalogue
169.	RF synthesizer & other RF component	9kHz to 1 GHz, power output -20dBm to +13 dBm
170.	High voltage Probe - 20 No.	Max voltage: 150kV, DC/Pulsed, divider ratio:10000:1 , cable length: 10ft with BNC connector, Accuracy: +/- 0.5%, Conformity certificate according to IEC 61010-1
171.	Current Sensor - 20 No.	Frequency: DC to 5MHz, current: 10A to 150A, o/p connector: BNC, Size: Approx 4x4Inches, weight: less than 700gm
172.	Cooling water Instrumentation: sensors with signal conditioner - 17 sets	Parameters to measure: water temperature, flow, pressure, conductivity. O/p voltage/current compatible with PLC
173.	Control valves for water line - 10 Nos.	1/2 inch, butterfly valve with electrical actuator
174.	Flexible hoses with QRC - 50 sets	Non-conductive hydraulic hose with quick release couplers at both ends required for active cooling of AC/DC converter modules. Core tube material: Polyester elastomer, Cover material: Polyurethane.
175.	Air purifier and compressor - 1 nos	1000 CFM, 6 bar compressor unit with air purifier
176.	Gas feed control valve - 1 nos	Needle value for fine control of fluid flow
177.	Magnetic snubber with Thermoplastic Casing - 15 nos	Nanocrystalline soft magnetic material core in circular form with thermoplastic casing
178.	CRIO system - 2sets	i. Bus connector: MXI Express X1 interface based on PCI Express ii. No. of slots: 14 iii. 32-channel, 7µS, digital I/O with DSUB connector, iv. MXI -Express Cable
179.	EMC Computable cubicle - 9 nos	EMI/EMC compatible cubicle mainly to house instrumentation. preferred with standard dust filter, fans, temperature sensors and position sensor, heigh ≥ 42U
180.	Industrial computer - 3 nos	Standard industrial computer for data acquisition and data storage, preferred with latest model/ technical specs
181.	8- core plastic Fiber Cable - 5000m	No. of core:8, Jack material: Polymer, Compatible with Avago Versatile Link Family of

		connectors and fiber optic components, Diameter: 1mm
182.	Industrial Workstation - 1 nos	Standard industrial work station for data storage, preferred with latest model/ technical specs to be used in control rooms for various physics experiments
183.	DC Disconnector - 35 nos	Air insulated, Indoor, off load operation, non-enclosed disconnector with and without earth bar. Rated voltage: 22kV, 50Hz, Rated current: 110A[min], Rated short circuit current: 5kA[min], No of pole : Two pole, Operating mechanism: Motorized, Device mounted. Compliance with IEC 62271-102
184.	High Voltage Relay - 2 nos	Air insulated HV relay, non-enclosed, Pole configuration: 2 Pole NO contact and 2 Pole DT contact, Continuous working voltage : 35kV DC, Continuous current : 5A [min], Mounting position: Horizontal, Operating mechanism: Motor or solenoid based, 230V, 50Hz, Auxiliary switch : 2 Nos [NO/NC/SPDT] per position
185.	High current power supply - 2 nos	1. 15V, 4kA, and 30V, 600A current: settable for 20% to 100%, Accuracy: 2%, Current resolution: 100A
186.	22kV Input cable-1000 mtr	Rated voltage 12/20/24kV, 95 cross section,class-2 copper conductor, XLPE insulation, single core cable, halogen free, low smoke
187.	Output DC coaxial cable with screen - 1000 mtr	Rated voltage 18/30/36kV, 95 cross section, class -2 copper conductor, helical copper wire screen lapped with copper tape having 35mm 2 cross section [min],copper tape outer screen, XLPE insulation, single core cable, halogen free, low smoke
188.	LV cable -3000 mtr	0.6/1/1.2kV, 25 cross section, class 5 copper conductor, silicon/EPR insulation, halogen free, low smoke single core cable
189.	Control cables - 1000 mtr	0.6/1/1.2kV, 2.5 cross section, class 5 copper conductor, EPR/HEPR insulation, multi-core, thermoplastic sheath, halogen free, low smoke
190.	RF (Radio frequency) lines - 600m	3⅛” coaxial line, RF frequency: 1MHz, Length: 600m
191.	RF Connectors - 200 nos	Connectors for 3⅛” coaxial line
192.	Butterfly type valves	Pneumatic operated butterfly valves of sizes from DN 150 to DN 600; pressure rating vary from 150# to 900#. Classifications as per ITER: QC-1, SC-1 (SF), SIC-2, Design temperature

		upto 270 degC. Qualification through shake table test
193.	3-D Print Model of ITER Tokamak	Will be used for outreach activities
194.	Oil free air compressor	Application: To run the Gate valve Specification: Storage Capacity: 30 Litre Air flow: 100 L/Minute (Approx.) Pressure: 8 Bar (Approx.)
195.	Standard storage containers	Standard Steel storage /cargo /shipping containers will be used for the Storage of In-Wall Shield (IWS) materials.
196.	High Power Amplifier (Driver and Final stage amplifiers for ITER ICRF sources) total 17 nos.	Specification of Tetrode based driver stage amplifier: 35-65MHz/130kW/2000s Specification of Diacrode based final stage amplifier: 35-65MHz/1.5 MW/2000s
197.	Alcohol based Hand Sanitizer	Isopropyl Alcohol(IPA) minimum 60% w/w
198.	High-temperature radiation source	Design, Manufacturing, Testing, and Supply of Hot source for ECE Diagnostic
199.	33kV 630 A High voltage offload change over switch panel	For changeover of High voltage regulated DC power supplies (APSS and EPSS) between Twin Source and ROBIN (experiments of Negative ion source technology) in offload condition
200.	PEEK material discs, washers, rods and sheets	Supply, packaging, transportation of the consumable PEEK material items viz. discs, washers, flanges, rod, sheets etc for the INTF components and vessel.
201.	EcosimPro Software	The software is used for the dynamic and steady-state process simulation
202.	High voltage relay – 5 Nos.	Type: Air insulated HV relay, non-enclosed, Relay contact form: SPNC and SPNO Normal operating voltage: 65kV DC Continuous current: 150Amp Test voltage: Between HV contact 100kV DC and Insulation to Ground 100kV DC, Actuator: 230V 50Hz Solenoid actuator Auxiliary switch: 4 Nos. NC/SPDT auxiliary switch per position

203.	High voltage relay – 5 Nos.	Type: Air insulated HV relay, non-enclosed, Relay contact form: SPNC and SPNO Normal operating voltage: 10kV DC Continuous current: 125Amp Test voltage: Between HV contact 15kV DC and Insulation to Ground 15kV DC, Actuator: 230V 50Hz Solenoid actuator Auxiliary switch: 4 Nos. NC/SPDT auxiliary switch per position
204.	SS316L(N)-IG material rods, pipes and plates	Manufacturing, Inspection, Packing and Transportation of the consumable SS316L(N)-IG material items viz. rods, pipes, plates etc for ITER Diagnostics components and systems. Generally 316L (N)-IG steel is grade 316L steel with narrower alloying element ranges and controlled impurities. The closest analogy is X2CrNiMo17-12-2 controlled nitrogen content austenitic stainless steel described in the RCC-MR Code, Edition 2007.
205.	ENOVIA - VPM Product Design Configuration (DER & DES Licenses)	ENOVIA License for CAD data management
206.	OEM-ITER CATIA V5 ITER Configuration(AL2) & CATIA ITER- MECHANICAL (MD2)	CAD software
207.	AMC for the existing perpetual MD2 licenses	AMC on CAD software (CATIA)
208.	FKM (Fluroelastomer) O-rings	FKM (Fluoroelastomer) Grade / Type : KB2452 or equivalent O-rings for vacuum sealing of INTF vacuum vessel
209.	Portable emissivity measurement device	Portable emissivity measurement device is used for the thermal emissivity measurement at room temperature.
210.	Metal Rack	MS Metal Rack open type with five shelves/compartments having size of 600mm Depth X 1220mm Width X 2175mm Height (+/- 5mm)
211.	Flexible Copper Cable	2.5 sqmm, 5 core, PVC insulated, Fexible Copper Cable and 2.5 sqmm, 3 core, PVC insulated, Fexible Copper Cable

<table>
<tr><td>212.</td><td>RF TETROD TUBE (TH781) FOR AMPLFIRS & OSCILATORS</td><td><table>
<tr><td>Operating Frequency Range</td><td>200MHz</td></tr>
<tr><td>Maximum voltage rating of anode</td><td>22 kVdc</td></tr>
<tr><td>Maximum peak cathode current</td><td>140A</td></tr>
<tr><td>Maximum anode dissipation</td><td>250kW</td></tr>
<tr><td>Maximum screen grid dissipation</td><td>4.0kW</td></tr>
<tr><td>Maximum control grid dissipation</td><td>1.5kW</td></tr>
<tr><td>Maximum screen grid bias voltage</td><td>1800Vdc</td></tr>
<tr><td>Maximum control grid bias voltage</td><td>-800V dc</td></tr>
<tr><td>Filament voltage</td><td>10 ± 0.5 Vdc</td></tr>
<tr><td>Filament current</td><td>300-340Adc</td></tr>
</table></td></tr>
<tr><td>213.</td><td>RF DIACRODE TUBE (TH628L) FOR AMPLFIRS & OSCILATORS</td><td><table>
<tr><td>Operating Frequency Range</td><td>200MHz</td></tr>
<tr><td>Maximum voltage rating of anode</td><td>~30 kV dc</td></tr>
<tr><td>Maximum peak cathode current</td><td>~650A</td></tr>
<tr><td>Maximum anode dissipation</td><td>≥1800kW</td></tr>
<tr><td>Maximum screen grid dissipation</td><td>≥14.0kW</td></tr>
<tr><td>Maximum control grid dissipation</td><td>≥4.5kW</td></tr>
<tr><td>Maximum screen grid bias voltage</td><td>~2000Vdc</td></tr>
<tr><td>Maximum control grid bias voltage</td><td>-2000V dc</td></tr>
<tr><td>Peak voltage between control grid and screen grid</td><td>4 kV</td></tr>
<tr><td>Filament voltage</td><td>20 ± 0.5 Vdc</td></tr>
</table></td></tr>
<tr><td>214.</td><td>Soft X-ray Pin diodes (~10Nos)</td><td>Reversible p-n junction Si diodes to measure soft x-rays in the form of current.</td></tr>
<tr><td>215.</td><td>X-ray beam monitor with electronics (~ 02Nos)</td><td>Photo diodes with built-in electronics and readout electronics with software to monitor x-ray output beam.</td></tr>
<tr><td>216.</td><td>DN 40CF Be window (~02Nos)</td><td>X-ray source window</td></tr>
</table>

217.	DN 40CF Al-Mylar window (~02Nos)	X-ray source window
218.	Prototype EB Welded transitions for Plasma Grid	Manufacturing, testing and supply of "prototype EB welded transitions for Plasma Grid" with overall size of 230mm X 230mm. The work require machining, EB welding of CU to Inconel & Cu to CU and drilling followed by visual, dimensional, He leak and pressure test.
219.	Thermoelectric Assemblies Heat Exchanger, Copper, Aluminum Tube-Fin with Fan kit	The copper tube-fin heat exchangers offer high performance and reliability. It is used to extract heat from air inside the electronics enclosure/rack. Extracted heat removed through water. It has copper tubing for water flow. High performance fan kit allow higher airflow through fins to improve performance.
220.	Revolving Chairs (120 Nos)	Revolving Charis for Office
221.	Water Dispenser (05 Nos.)	Floor mounted water dispenser, with buyback of old units
222.	AHU Duct Insulation (485 sqmm)	Thermal Insulation for SA & RA Ducting of HVAC system at II lab, IPR Campus
223.	High Voltage Relay /Disconnector (37 Nos.)	Air insulated HV relay, non enclosed, Pole configuration: 2 Pole NO contact and 2 Pole DT contact, Continuous working voltage : 35kV DC, Continuous current : 5A [min], Mounting position: Horizontal, Operating mechanism: Motor or solenoid based, 230V, 50Hz, Auxiliary switch : 2 Nos [NO/NC/SPDT] per position
224.	Aluminum Oxide (Alpha Phase) (Qty. 250 gram)	Composition - α-Al_2O_3, Molecular weight- 101.96 g, Purity - 99.999% pure, Color- White solid powder, Grade- Industrial, Form- Nano-powder, Average particle size- 20-30 nm, Melting point $\geq$ 2072 °C, Surface Area ~ 10-20m^2/g, Density- 3.98 g/cm^3
225.	Zirconium(IV) oxide-yttria stabilized (8 mol% yttria) (Qty. 100 gram)	Contains- 8 mol % Yttria as a stabilizer (Fully stabilized ZrO_2), Composition - $(ZrO_2)_{0.92}(Y_2O_3)_{0.08}$, Molecular weight- 349.03g, Purity - 99.999% pure, Color- White solid powder, Grade- Industrial, Form- Nano-powder, Average particle size- 20-30

		nm, Melting point ≥ 2,600 °C (lit.), Surface Area ≥ 100 m^2/g, Density- 5.4 g/cm^3
226.	Multi axis articulated arm based CMM with its peripherals including software (Qty. 01 Nos.)	Range of Measurement- 3m*3m*3m(l*b*h), Type of measurement- Probing or scanning or both, Arm type- Articulated arm type with multi axis rotation for maximum reachability
227.	Fan filter unit for clean room- 6 Nos.	FAN filter unit with 1000 CFM, DIDW type, statically and dynamically balanced with HEPA filter H14.
228.	Driver Stage Amplifier (HPA2), Trombone & Final Stage Amplifier (HPA3) for ITER ICRF Power sources: 18 sets	1) Input power 1 to 10kW 2) Output power for HPA2+Trombone+HPA3 will be 1.5MW/35-60 MHz/VSWR2 OR/AND 1.6MW/40-55 MHz/VSWR1.75 for single RF chain 3) Such two RF chain components will be used to get 2.5MW/35-60 MHz/VSWR2 OR/AND 3MW/40-55 MHz/VSWR1.5 with combiner.
229.	Transport of 3 ACBs from SIMIC Italy to ITER Organization, France	Transport of 3 ACBs [ACB-5(CP), ACB-2(TF), ACB-1(CS)] from M/s SIMIC, Italy to ITER organization, France including loading, unloading and handling at ports as per INCOTERMS 2020 DAP at delivery point, Fos Sur Mer, (GPMM), France
230.	Design, Manufacturing, Factory testing, Delivery, and on-site demonstration of High-Power Thyristor Converter – 01 No.	Output current: 5000 A dc (Programmable) Output voltage: Up to 500 V dc
231.	CAMC of attendance monitoring machine	CAMC of attendance monitoring machine with supporting UPS
232.	HHLT Vacuum Vessel	Manufacturing, Testing, Supply, Installation and Commissioning of HHLT Vacuum Vessel
233.	ENOVIA Vault Administration-VAR	ENOVIA License for Vault Administration (Qty-01)
234.	ENOVIA Professional User -MGR	ENOVIA license for Professional User (Qty-01)
235.	ENOVIA System & Data Administrator - RVR	ENOVIA license for System & Data Administrator (Qty-02)

236.	Transportation, handling and preservation.	Transportation handling and preservation for the In Wall Shielding (IWS) materials.
237.	10 Workstations for Design & Analysis section	Workstation to replace our old HP Z800/Z820 series workstations for CAD & simulation purpose.
238.	Manufacturing, Assembly, Testing and Supply of Vacuum Capacitor Assembly	Manufacturing, Assembly, Testing and Supply of Capacitor Assembly as per Technical Requirements. Procurement of raw material for the complete capacitor assembly. Supply of complete assembly at the purchaser's site.
239.	Unflange Elbow Asymmetrical Assembly and Unflanged Elbow Symmetrical Assembly	Supply of Unflanged Elbows as per drawings and Bill of Quantity. It includes materials, fabrication/brazing work, assembly and transportation of the items at the Purchaser's site.
240.	Operational management services for IT end user support	Operational management services for IT end user support
241.	Facility management services for IT server and network management.	Facility management services for IT server and network management.
242.	V1 flow monitor Control Unit with Mechanical Window (Qty. 6 Nos.)	V-series Control Unit With one micro switch set point. Flow Range 6-12 LPM for Qty 3 Nos.
243.	Thomas Keating Radar Absorbing Materials (TK RAM) Tiles - Big and Small	These microwave and THz absorbing materials will be used to calibrate the fast scanning Martin-Puplett interferometer diagnostic
244.	Liaison Consultancy Services (Liaison consultant) to liaise with statutory authorities for obtaining clearances, approvals and permissions for the proposed new construction projects at IPR campus	i. Liaison Consultancy firm (Liaison Consultant) is responsible to take up liaising work related to obtain mandatory statutory clearances, approvals and permissions for all stage of proposed new construction works inside IPR campus. The scope of work covers all construction stages that need liaising to obtain Statutory approvals and permissions like Statutory Approvals required during Pre-Construction, during Construction, and Post-Construction stages, but shall not be limited to only these approvals. All Mandatory and obligatory actions to complete the Statutory clearances,

<table>
<tr><td></td><td></td><td>approvals and permissions for the construction clearances and permissions, environment clearances and permissions related to building usages, same shall be arranged by the successful bidder and covered in the scope of Liaison Consultancy firm (Liaison Consultant) without claiming any additional cost/charges for the same.
ii. Liaison Consultancy firm (Liaison Consultant) shall obtain all statutory clearances from Statutory Authorities (GMC/AMC/GUDA/AUDA/ other Statutory Authorities as applicable), for the proposed new construction projects (1) ITER-India office building (2) New Canteen Building (3) Reception Building (4) Sewage Treatment Plant (STP) (5) Shed for stores and (6) Land Ownership (if any) related clearances etc.</td></tr>
<tr><td>245.</td><td>Forex Service</td><td>To have access of spot exchange rate so that reasonability of bank offered rate can be ensured.</td></tr>
<tr><td>246.</td><td>Electric torque wrench (Qty. 2)</td><td><table><tr><th>Requirements</th><th>Values</th></tr><tr><td>Torque range</td><td>750 to 2000 Nm with increment of not >100Nm.</td></tr><tr><td>Type</td><td>Non-impact type hand held.</td></tr><tr><td>Weight</td><td>Should be less than 15KG.</td></tr><tr><td>Impact socket required</td><td>Socket for M30 bolting.</td></tr><tr><td>Electrical requirements</td><td>For chord type- 230v single phase AC,
For cordless- Battery type compactable with 230v charging.</td></tr></table></td></tr>
<tr><td>247.</td><td>Helium Gas (Quantity: 20 Nm3)</td><td>Helium Gas with minimum purity 99%

The helium gas will be used in experiments planned at the ITER-India cryo lab.</td></tr>
<tr><td>248.</td><td>Fire Extinguishers (Qty. 95 Nos.)</td><td>Clean Agent, Dry Powder and CO2 based Fire Extinguishers</td></tr>
</table>

249.	Caster Wheels	Loading capacity : 1200 kg Diameter: 250 mm
250.	Third Party Inspection (TPI) of contract for "Manufacturing, Testing and Supply of DNB and HNB3 Vessel" (100 man-months)	Third Party Inspection Agency will be appointed by ITER-India to carry out Inspection during the DNB and HNB3 Vessel Manufacturing at contractor and its subcontractor premises.
251.	Thyratron Unit with its Compatible Driver Module (02 Set) for Crowbar Application	Peak Forward anode voltage: ≥70kV Peak Forward anode current: ≥50kA Peak reverse anode current: ≥5kA Pulse repetition rate: ≥ 0.5 Hz
252.	End Point security and Protection Software (quantity 300)	Software for protection against virus and other threats on computer
253.	Procurement, Supply, Transportation, Loading, Unloading, Fabrication, Fixing, Erection and Installation of structural steel roofing sheds over the supply air duct in ITER-India Lab Building 5th and 6th floor.	Scope of work include procurement and Supply of material require for roofing sheds, Transportation, Loading, Unloading, Shifting of material, Fabrication, Painting, Fixing, Erection and Installation of structural steel roofing sheds over the insulated supply air ducting in ITER-India Lab Building on the terrace i.e. 5th and 6th floor of the building.
254.	Vacuum compatible cable with connector	Vacuum compatible cable with connector are generally used inside high-vacuum chamber for electrical connections.
255.	Power feedthrough with single/multiple pins	Power feedthroughs are used to transmit power from external power supply to components placed inside vacuum chamber.
256.	Connector/coaxial feedthrough with single multiple pins with connector	Connector/coaxial feedthrough with connector-plug configuration enables connection to electrical components inside the vacuum chamber with electrical system on air-side. These feedthroughs come with single pin to multiple pin configuration.
257.	Fiber Collimator Lens: Plano convex lens - material-BK7,	Lens material-BK7, Focal length 25 mm Diameter -12.5 mm, Fiber connector-SMA, Mount-Anodized aluminium, Mount diameter-20mm, Clear aperture-10 mm, Anti-reflection(AR) coating - Broad band AR coating in visible region, Quantity- 40 Nos.

258.	Fiber Collimator Lens: Plano convex lens - material-Multi element	Lens material-Multi element Focal length 12 mm Fiber connector-SMA, Mount- Anodized aluminium, Mount diameter- 12mm, Clear aperture-5 mm, Anti-reflection(AR) coating - Broad band AR coating in visible region, Quantity- 14 Nos.
259.	Supply and Installation of Safety Barricading using Aluminum Partition Grills with Stainless Steel Structures at the ITER-India Gyrotron Test Facility	The specifications are as follows: • Aluminum Grill (Thickness approximately 10 mm, Density (mass/area) greater than 2.5 Kg/m2) • Aluminum frame profile section (16-gauge thickness (at least 1.5 mm) and Weight/length at least 0.875 Kg/m) • SS 304 C channel (Size: 75mm x 40mm, web thickness 5mm, flange thickness 7mm)
260.	Electromechanical System	Manufacturing, Integration & Testing of Electromechanical system comprises of Electrical, Mechanical, I&C along with custom build items.
261.	Hydrogen Cylinder with high purity Hydrogen gas Quantity- 3 Nos. of 47L WC and 1No. of 10L WC	Specification: H2 Purity: 99.999%, Moisture: $\leq$ 2 ppm, Oxygen $\leq$ 2 ppm, Hydrocarbon: $\leq$ 0.5 ppm, CO $\leq$ 0.5 ppm, CO2: $\leq$ 0.5 ppm, Cylinder & valve: Brand new Steel cylinder with Brass Valve and Valve guard & LH valve., Pressure: 140 kg/cm² ±10%.
262.	Online UPS (08 Nos.)	1 KVA Online UPS for Workstations
263.	Furniture for INTF Control room	Furniture for INTF Control room (Consolidated with multiple items)
264.	Ceramic Post Insulator Rods	1. Supply of 10 no. s Ceramic/Alumina Post Insulators Rods as per drawings and material requirements. 2. Provide the material test certificate as per the technical specification.
265.	Post Insulator (PI) - Shield Components	1. Review of Engineering design for materials specification, manufacturing feasibility, test qualification and suggest changes, if required. During review of engineering drawing, Vendor must scrutinize the

		drawings provided by ITER-INDIA for any discrepancy or lack of information. 2. Preparation of manufacturing drawings these specifications. 3. Procurements of all necessary materials, items and equipment with test certificates. 4. Manufacture of all components and assemblies according to manufacturing drawings as approved by ITER-INDIA. 5. Supply of all items as per BOQ.
266.	Heavy duty long span storage System	Material: Mild Steel, Dimension: H ~2500 mm X D ~900 mm X W ~3000 mm
267.	Aluminum Profile with Accessories	T Slot Aluminum Profile 40 mm X 40 mm, 4 Slot, Weight ≥ 1.0 kg/m; Accessories: T Bolt M8x25 Hammer Head with Hex Flange Nut, Angle Bracket, Flat Bracket
268.	Supply and Installation of Cable Trays & Earthing point(s) and Installation of Copper Foil	a) Supply and Installation of Wire mesh and perforated Cable Tray(s) as per specifications b) Supply and Installation of Earthing point(s) as per specifications c) Laying, Installation and joining of Copper Foil(s) as per specifications
269.	Charcoal Coating with Cryogenic Adhesive On Copper Panels (Qty. 12 nos.)	Copper Panel Dimensions: 2.8 m X 0.330 m X 0.003 m. After coating they will be used as Cryopanels in INTF Cryopumps.
270.	Ceramic based water feed through (Qty. 10 nos.)	a. Pure alumina (Glazed) is requested, with Al2O3 content > 99%. Relevant test certificate must be provided to IPR for approval prior to start of manufacturing. b. Stainless steel (304L) conforming to ASTM specification A240/A312/A314 / equivalent Indian standard. c. Kovar material conforming to ASTM Specification ASTM F15 alloy / equivalent / equivalent Indian standards.
271.	RGA and Vacuum Gauges for INTF	High pressure RGA would be used for leak testing in INTF at higher pressure (10-4 to 10-2 mbar) Various type of vacuum gauges (pirani gauge, Full range gauge, capacitance monometer ect.) would be used during the source and BLC operation in INTF experiments.

272.	TMP pumping system for INTF	High capacity pumping speed (approx. 3000 l/s per TMP) would require to handle high gas loads from Plasma source and BLC components in the INTF to achieve pressure in the range of 10-6 mbar. The pumping system consists of TMPs, High vacuum gate valves and rotary pumps.
273.	High Purity Indium Foil	Indium foil with purity ≥ 99.995 % to be used as thermal interface material in cryogenic applications
274.	Alumina disc	Machinable alumina disc with purity Greater than 99% Al2O3
275.	Design of CCWS-2F and CHWS-H4	The scope of design consists of mainly carrying out detailed studies/Analyses of existing conceptual design for feasibility and operability, selection of process parameters i.e. design temperature, pressure, flow, system sizing & optimization, preparation/update of Process Flow Diagrams (PFD), Piping and Instrumentation Drawings (P&ID), selection of system components based on engineering input and vendor catalogues/interactions, system optimization, preparation of technical data sheets of equipment, and instruments, carrying out piping stress analysis, interface definitions, etc. (Duration: 12 months)
276.	Supply of Cable Protectors	a) Supply of 2 channel cable protector as per specifications b) Supply of 5 channel cable protector as per specifications
277.	Acrylic Sheets	1800mm × 1200mm Acrylic Sheets having thickness 5 mm
278.	Tritiated target (Tritium Target) along with Target holder assembly – 02 Nos.	This item consists of two tritium targets also with target holder assembly which includes two tritium targets, Pneumatic 100 CF gate valve, 100 CF Vacuum ceramic break, 40 KF Vacuum ceramic break, Oil Free Scroll Vacuum Pump, ZnS window, IR camera, 40KF Vacuum flexible hose, 40 KF clamp and 40 KF cantering ring
279.	Software/code license	Software/code license, CLOUD license subscription and online service support

280.	Fast Data Acquisition Module NI PXIe-6368 with Accessories	This module will be used for prototyping the Instrumentation & Control (I&C) systems for the ECE diagnostic system and the ECRH system.
281.	PXIe system	NI PXIe-1084 (18-Slot 3U PXI Express/PXI Chassis,17 hybrid slots, ,58 W total power with accessories (Power cord, 250V,10A India.), PXIe-8361 MXI-Express interface, 214 MB/s PXI remote control module, PCIe-8363 Gen1 PCI Express Host, 208 MB/s,1 Port, MXI Express Device for PXI remote control.