

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Fabrication, Supply & Installation of Mini-Cooling Manifold

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Table of Contents

List of Tables	3
List of Figures	3
List of Abbreviations	3
Applicable Codes and Standards.....	4
1. Scope of Supply	5
2. Scope of Work.....	5
3. Instructions to Bidder (additional):.....	6
3.1 Precautions to be followed during the site work.....	7
4. Technical Specifications	8
4.1 BOQ and technical specifications for fabrication work	8
4.2 Technical Specifications Globe Valve (Flow Control).....	9
4.3 Technical Specifications Ball Valve.....	10
4.4 Technical Specifications Pressure reducing valve	11
4.5 Technical Specifications of Flowmeters.....	12
4.6 Technical Specifications RTD with head-mounted transmitter	12
4.7 Technical Specifications Pressure Indicator cum Transmitter (PIT).....	13
4.8 Technical Specifications Cable for instrumentation	14
5. Prefabrication & Quality Control	15
5.1 Material Requirements	15
5.2 Welding and Non-Destructive Testing (NDT).....	15
6. FAT, Pre-dispatch Inspection & Dispatch Clearance	16
7. Final Acceptance	17
8. CAD schematic for understanding the work-scope	18
Annexure-1: List of drawings & schematics.....	20

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

List of Tables

Table 1: Scope of Supply
Table 2: List of Facilities Available at ITER-India Site
Table 3: Component Wise Specifications for Fabrication (BOQ)
Table 4: Globe Valve (Flow Control Valve) Specifications
Table 5: Ball (Isolation) Valve Specifications
Table 6: Pressure Reducing Valve Specifications
Table 7: Technical Specifications of Flowmeters
Table 8: Specifications of RTD
Table 9: Specification of Pressure Indicator cum Transmitter
Table 10: Specification of Cable
Table 11: List of Tests to be Performed for Respective Components and List of Documents to be Submitted by Supplier
Table 12: List of Drawings for the Project
Table 13: Essential Eligibility Criteria for Bidders

List of Figures

- **Figure 1:** Integrated View of Fabricated Cooling Channels (Mini Cooling Manifold)
- **Figure 2:** Identification of locations for integration

List of Abbreviations

- **BOQ:** Bill of Quantities
- **DM Water:** Demineralized Water
- **FAT:** Factory Acceptance Test
- **GTAW:** Gas Tungsten Arc Welding
- **HART:** Highway Addressable Remote Transducer Protocol
- **IP-65:** Ingress Protection Rating 65
- **MOC:** Material of Construction
- **MTC:** Material Test Certificate
- **NABL:** National Accreditation Board for Testing and Calibration Laboratories
- **NDT:** Non-Destructive Testing
- **OEM:** Original Equipment Manufacturer
- **PIT:** Pressure Indicator cum Transmitter
- **PQR:** Procedure Qualification Records
- **PRV:** Pressure Reducing Valve
- **RTD:** Resistance Temperature Detector
- **RT:** Radiographic Testing
- **SAT:** Site Acceptance Test
- **TIG:** Tungsten Inert Gas (Welding)
- **WPS:** Welding Procedure Specification
- **WPQ:** Welder Performance Qualification

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Applicable Codes and Standards

The design, material procurement, fabrication, welding, inspection, testing, and quality assurance activities shall comply with the latest applicable editions of the following codes and standards unless otherwise specified.

S. No.	Code / Standard	Description
1	ASME B31.3	Process Piping – Design, Fabrication, Examination and Testing
2	ASME Section IX	Qualification of Welding Procedures (WPS/PQR) and Welder Performance Qualification (WPQ/WQT)
3	ASME Section V	Non-Destructive Examination
4	ASTM A312	Stainless Steel Pipes (SS304/SS316)
5	ASTM A403	Stainless Steel Butt-Welding Pipe Fittings
6	ASTM A240	Stainless Steel Plates, Sheets and Strips
7	ASTM A182	Stainless Steel Forged Flanges and Forged Fittings (where applicable)
8	ASTM A351	Cast Stainless Steel Valve Bodies (where applicable)

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

1. Scope of Supply

Supply of mini cooling manifold along with fittings, accessories & instrumentation as per below tabulation.

S. No.	Name of deliverables		Quantity
1	Supply Manifold assembly with	Pressure indicator cum transmitter (PIT)	As per BOQ mentioned in table3.
		Valves & Fittings	
		Bellow (Metallic flexible hose)	
2	Return Manifold assembly with	Flowmeter	
		Resistance Temperature Detector (RTD)	
		Valves & Fittings	
		Bellow (Metallic flexible hose)	

Table 1: Scope of Supply

2. Scope of Work

The main scope of work includes fabrication & supply of mini cooling manifold as per attached drawings along with fitting, accessories & instrumentation.

Details are summarized below:

1. Study of schematic and drawings as per attached Annexure-1
2. Procurement of all required materials/items as per the BOQ, specifications and as per the attached schematics & drawings in Annexure-1.
3. **All welding shall be carried out exclusively using the Gas Tungsten Arc Welding (GTAW/TIG) process. Cutting, machining, and fabrication of SS 304 components, including C-channels, L-angles, pipes, flanges, supports, and other associated items, shall be carried out in accordance with the attached drawings and schematics provided in Annexure-1.**
4. **The supplier shall prepare and implement qualified Welding Procedure Specifications (WPS) supported by Procedure Qualification Records (PQR), and all welding shall be performed only by qualified welders holding valid Welder Performance Qualification (WPQ/WQT) certificates. Copies of the WPS, PQR, and valid welder qualification certificates shall be submitted to ITER-India for review prior to commencement of fabrication.1.**
5. It is preferred that prefabricated SS304 piping module along with support structures properly fitted/ mounted using U clamps with piping fittings and instrumentation be supplied at site for fast installation and erecting work, consequently reducing the work hour in the lab due to the limited available work space.
6. Performing hydro testing, specified Non-Destructive Testing (NDT), including 10% Radiographic Testing (RT) of welded butt joints, and all other required quality assurance tests on the assembled system in accordance with the applicable specifications and acceptance criteria.

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

7. Delivery of prefabricated assemblies and accessories to ITER-India site.
8. Obtain the work permit from ITER-India, before start of execution of work.
9. **Minor modification work, mechanical connection and installation of the mini cooling manifold with the existing cooling distribution manifold using U clamps and welding to achieve a rigid and structurally stable assembly for operational and testing activities.**
10. The supplier shall propose any necessary changes or improvements in the design to meet fabrication and assembly requirements. Accordingly, the contractor is responsible for preparing and submitting manufacturing drawings for review and approval.
11. Supplier to present/submit MTC for any of the procured raw materials if requested by ITER-India.
12. The following points are to be kept in mind:
 - a. Cleaning of the site on a regular basis at the end of the day as per the satisfaction of the engineer-in-charge or authorized personnel.
 - b. Working hours available generally at the site will be 9:30 a.m. to 17:30 p.m. from Monday to Friday, excluding any government-declared holiday.
13. Please refer to https://www.ipr.res.in/documents/safety_protocols.html for safety protocols safety reporting forms applicable during site work.

3. Instructions to Bidder (additional):

1. Before bid submission, it is recommended that the bidder inspects the site of work and get fully acquaint himself about the conditions prevailing at site, availability of facilities, availability of vacant space and suitable location for transport access, the extent of stairs and crane involved in the work (over the entire duration of contract) including local conditions, as required for satisfactory execution of the work and nothing extra whatsoever shall be paid on this account.
2. It shall be deemed that the bidder shall have satisfied himself as to the nature and location of the work, transport access, availability of space for integration work etc. The ITER-India will bear no responsibility for lack of such knowledge and the consequences thereof.
3. The Successful bidder shall be responsible for the true and proper setting out of the work in coordination with the Engineer-in-charge or his authorized representatives and for the correctness of the positions, levels, dimensions and alignments of all parts of the structure and for the provisions of all necessary instruments' appliances and labor in connection therewith.
4. If at any time, during the progress of work, any error appears or arises in the position, levels, dimensions or alignment of any part of the work, the contractor on being asked to do so by the Engineer-in-charge, shall rectify such error to the entire satisfaction of Engineer-in-charge. The checking by the Engineer-in-charge or his authorized representative shall not relieve the contractor of his responsibility for the correctness of any setting out of any line or level.
5. Facilities available at installation site (3rd floor) for use: Overhead crane (Capacity: 05 ton) and Power points for use of electrical power. Details shall be checked by the bidder at the time of site visit.

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

List of facilities available during SAT	
S. No.	Items
1	DM Water
2	Overhead crane
3	Lift for material movement
4	Electrical point

Table 2: List of facilities available at ITER-India site

6. Bidder has to study all the drawings thoroughly and incase of any query/question, it should be sought from ITER-India before bid submission.
7. Bidder has to fill up the technical compliance sheet as per Table-3 to Table-10 and submit along with the bid and incase of any query/question, it should be sought from ITER-India before bid submission.
8. As a proof of compliance, the bidder has to submit the verifiable OEM published data sheet for the proposed Flow-meters and other instrumentation along with valves. Bidders are requested to do their technical and commercial evaluation for technical compliance and cost estimation before proposing a make & model in their bid. Authenticity of the data sheets that cannot be verified through the OEM's web site may not be considered for evaluation and such bids may be rejected. Bidders are requested quote good quality reliable and reputed products meeting all the technical specifications only.
9. At the bidding stage, the bidder shall submit a signed undertaking confirming compliance with the specified welding and NDT requirements. The relevant supporting documents, such as WPS/PQR, WPQ/WQT certificates, NDT procedures and RT records, shall be submitted during execution, prior to commencement of the relevant welding/NDT activities.
10. As a confirmation that bidder has gone through the drawings and understood the full scope of work, signed & stamped copies of all the drawings are to be submitted along with the bid.
11. Bidder has to fill the details of make and model for the particulars in corresponding tables.

3.1 Precautions to be followed during the site work

1. The contractor is required to take necessary measures to ensure the safety of personnel & equipment. The contractor is fully responsible for the safety of the man, materials & machinery while executing the site work. Please refer to the link https://www.ipr.res.in/documents/safety_protocols.html for safety protocols and reporting forms applicable for IPR/ITER-India lab site.
2. Work should be done only in the presence of ITER-India representative(s).
3. Scratches, dents and tool marks are not allowed on the surfaces, Panels & other equipment in site.
4. The work shall be carried out in such a manner so as not to adversely interfere/or effect or disturb other works being executed in adjacent labs, if any.

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

5. Any loss/ damages done by the contractor to any existing work or facility at ITER-India Lab building being executed by other agencies shall be made good by him at his own cost and risk.
6. Some restrictions may be imposed by the Institutes security staff etc., on the working and for movement of labor, materials etc. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account.

4 Technical Specifications

Detailed drawings: Detailed drawings in annexure-1 consisting of all necessary specifications are attached here with.

4.1 BOQ and technical specifications for fabrication work

S. N.	Component Description		Material Specifications		Quantity	Bidder Compliance
1.	Pipelines & fittings	Line Size: DN 40	Material: SS304 (nonmagnetic grade) for cooling water application Schedule: 40S (Seamless) Fittings: It will include all elbows, flanges, gaskets and blind flanges and complete set of fasteners. Operating Pressure: 6 Bar; Test Pressure: 9 Bar Maximum Temperature: 70 °C		As per attached drawing quantities (Annexure-1)	
		Line Size: DN 25				
		Line Size: DN 15				
2.	Support structure material	C Channel	Material: SS304 Size: 75mm X 40mm X 5mm		As per attached drawing quantities (Annexure-1)	
		L Angle	Size: 40mm X 40mm X 5mm			
3.	Valves					
3.1	Flow Control Valve	DN 15	Globe type, Flanged end valve, MOC: SS304/ SS316, table 4		4 Nos	
		DN 25			1 No	
3.2	Ball Valve	DN 15	MOC: SS304, table 5	Threaded type	3 Nos	
		DN 25		Flanged end	4 Nos	
				Flanged end	2 Nos	
		DN 40	MOC: SS304, flanged end		2 No	
3.3	Pressure reducing valve (PRV)	DN 15	MOC: SS304, flanged end, table 6		4 Nos	
		DN 25			1 No	
4	Instrumentation*					
4.1	Flowmeter^	Line Size: DN 15 [#]	Please refer table 7, for complete specifications		5 Nos	
		Line Size: DN 25 [#]	Please refer table 7, for complete specifications		2 Nos	

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

4.2	Resistance Temperature Detector (RTD)	DN 15	Please refer table 8, for complete specifications		7 Nos	
4.3	Pressure Indicator cum Transmitter (PIT)	DN 15	Please refer table 9, for complete specifications		5 Nos	
4.4	Metallic flexible hose	DN 40	Material: SS304, Flanged end	2.5 meters	1 No	
				2 meters	1 No	
4.5	Cable	2 cores	Please refer table 10, for complete specifications		500 mts	
		4 cores	Please refer table 10, for complete specifications		500 mts	

*Please duly submit the verifiable openly published data sheets of the proposed models along with the bid as a proof of compliance. Bidders are requested to do their technical and commercial evaluation for technical compliance and cost estimation before proposing a model in their bid.

^Recommended Makes: Flow meters of well-established & proven makes and models that are complying with the specifications are only allowed. Makes Such as: Krohne Marshall, Yokogawa, Honeywell, Emerson or equivalent may be considered.

#Please specify the proposed make and models

Table 3: Component wise specifications for fabrication (BOQ)

4.2 Technical Specifications Globe Valve (Flow Control)

To function as **Flow-control valve** these globe valves will be required in each cooling branch for precise flow regulation of cooling water.

Specification Name		Detail	Required Value	Bidders comment & compliance notes
Make & model		specify		
Operating mode		Hand Wheel – Top mounted	Globe type	
MOC	Body	Including Stem & Gland	ASTM A351 CF8	
	Trim	Seat/ Plug/ Disk-Wetted Part	ASTM A351 CF8M	
	Gasket	PTFE or better (for DM Water application) [seal or packing]	PTFE	
End connections		Flanged end, Class 150	ASME B16.34	
Trim Characteristic		Equal Percentage/ Linear	Linear	
Valve settings		Orifice opening at rated flow	~ 60-80%	
Nominal Pressure			~ 2-4 Bar(g)	
Maximum Pressure			9 Bar(g)	
Temperature range		Must withstand up to 70 °C	15 to 70 °C	
Leak tightness		class VI	API 598	

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Line Size	15 NB	Flow range	5 to 30 LPM	
		Nominal Flow	15 LPM	
		C _v / K _v Value	C _v ≈12	
		Pressure drop	≤ 0.2 Bar	
		Loss Coefficient	Compatible with specifications	
	25 NB	Flow range	30 to 60 LPM	
		Nominal Flow	50 LPM	
		C _v / K _v Value	C _v ≈16	
		Pressure drop	≤ 0.2 Bar	
		Loss Coefficient	Compatible with specifications	

Table 4: Globe Valve (Flow Control Valve) Specifications

4.3 Technical Specifications Ball Valve

Main purpose of Ball Valves is to isolate the branch component from cooling fluid, so that intermediate adjustment like pressure setting, flow setting or maintenance kind of activity can be held.

Specification Name		Detail	Required Value	Bidders comment & compliance notes
Make & model		specify		
MOC	Body	Including Stem & Gland	ASTM A351 CF8	
	Trim	Seat/ Plug/ Ball-Wetted Part	ASTM A351 CF8M	
	Gasket	PTFE or better (for DM Water application) [seal or packing]	PTFE or better	
End connections		Flanged end, Class 150	ASME B16.5	
Construction		3 piece	3 piece	
Hole		Full Bore	Full Bore	
Operating mode		Manual Lever Operated	Manual Lever Operated	
Leak tightness		class VI	API 598	
Handle		MS/ MI with plastic cover	MS/ MI with plastic cover	
Nominal Pressure			≈ 4 Bar(g)	
Maximum Pressure			9 Bar(g)	
Pressure Drop		Should be negligible	≤ 0.1Bar	
Temperature range		Must withstand up to 70 °C	15 to 70 °C	

Table 5: Ball (Isolation) Valve Specifications

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

4.4 Technical Specifications Pressure reducing valve

To function as online Pressure Reducing Valve -Diaphragm type of PRV is required to control the pressure marginally below to limiting value of components in order to run the system safely.

Specification Name		Detail		Required Value	Bidders comment & compliance notes
Make & model		specify			
Operating mode		Pilot Operated		Diaphragm type	
MOC	Body	Including Stem & Gland		ASTM A351 CF8	
	Trim	Seat/ Plug/ Disk-Wetted Part		ASTM A351 CF8M	
	Gasket	PTFE or better (for DM Water application) [seal or packing]		PTFE or better	
End connections		Flanged end, Class 150		ASME B16.34	
Seat		Replaceable		stainless steel	
Diaphragm		EPDM/Viton		EPDM/Viton	
Nominal Pressure				≈ 4 Bar(g)	
Maximum Pressure				9 Bar(g)	
Temperature range				15 to 70 °C	
	25 NB	PRV 1	Set Point	3 Bar(g)	
			ΔP	1 Bar(g)	
			Set Range	2.5 - 4 Bar(g)	
			Flow	≈ 50 LPM	
			Cv / Kv	Cv ≈ 25	
			Valve Size	25 NB	
	15 NB	PRV 2	Set Point	3 Bar(g)	
			ΔP	0.5 Bar(g)	
			Set Range	2-4 Bar(g)	
			Flow	≈ 15 LPM	
			Cv / Kv	Cv ≈ 10	
			Valve Size	15 NB	
Leak tightness		class VI		API 598	

Table 6: Pressure Reducing Valve Specifications

- The valves should be delivered with '1/4-inch pressure gauge connection' with one set of 2" dial size pressure gauge connected for downstream pressure measurement.
- The internal parts like valve disc, trim parts may be of easily replaceable type without removing the whole body from the line.

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

4.5 Technical Specifications of Flowmeters

Specification Name	Detail	Required Value	Bidders comment & compliance notes
Make	Specify		
Model	Specify		
Sizing	Type 1	Flow range	~ (6 - 30) LPM
		Line Size	DN 15
	Type 2	Flow range	~ (25 - 80) LPM
		Line Size	DN 25
Measuring Technique	DN 15	Vortex type	
	DN 25	Vortex type	
MOC –Flow Sensor SS316, Housing - Non-magnetic material, SS304/ SS316/Die-cast Aluminum with matching fasteners SS304 or better.			
Display		LCD with backlight or LED display; LPM unit	
Process Connection	DN 15	Flanged end, Class 150, ASME B16.5	
	DN 25		
Nominal Pressure	Operating between	0- 6 Bar(g)	
Maximum Pressure	Must withstand at least	9 Bar(g)	
Temperature		15 to 70 °C	
Accuracy (<i>ITER-India on its own discretion may witness the Calibration test</i>)		±1 % of full-scale flow rate or better	
	Calibration	3 or 5-Point Calibration report to be included.	
Protection		as per IP-65 or better	
Pressure Drop		≤ 0.3 Bar at 100% flow range	
Power Supply		24V Loop power supply preferred	
Current measurement		2-wire method	
Transmitter analog output signal monitoring		4-20 mA, with HART Protocol.	

Table 7: Technical Specifications of Flowmeters

4.6 Technical Specifications RTD with head-mounted transmitter

Temperature at inlet and outlet of various thermal load components can be measured using RTD.

Specification Name	Detail	Required Value	Bidders comment & compliance notes
Make / Model	Specify		

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

MOC	Sensing Element	High purity Platinum wire	
	Wetted part	SS316	
	Housing & matching fasteners	SS304	
	RTD insert	SS304 or SS316	
	Insulation Material	Mineral (MgO) insulated	
	Type of sensor & Transmitters output	PT1000 4-wire & 4-20 mA	
RTD Head Assembly	Case & Cover	Die Cast Aluminum	
	Process Connection	½ inch NPT (M)/ BSP (M)	
Thermowell with hole for direct contact	Material	SS304L or SS316L	
	Opening for RTD	½ inch NPT (F)/ BSP (F)	
Accuracy		Tolerance Class A	
Repeatability		< ± 0.2% of reading	
Dimension	Stem diameter	~ 3 mm	
	Stem length	60 mm	
Pressure	Must withstand at least 10 Bar(g)	Operating between 0- 6 Bar(g)	
Temperature	Typical Operating range	0 to 100 °C	
Power supply Compatibility		Compatible with 24V DC Loop Power Supply	
Accessories Included (if any)	Specify		
Weight (kg)	Specify		

Table 8: RTD Specifications

4.7 Technical Specifications Pressure Indicator cum Transmitter (PIT)

Pressure available with flowing fluid in pipelines can be measured using pressure indicator cum transmitter.

Specification Name	Detail	Required Value	Bidders comment & compliance notes
Make/Model	Specify		
MOC	Wetted part	SS316	
	Sensing element	Ceramic/SS316 with Viton/EPDM sealing	
	housing and matching fasteners	SS304	
Type of sensor & Transmitters.	Specify		
Process connection		1/2" NPT(M) insert type	

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Display	'transmitter with display type'	4 Digit LED/LCD in Bar(g) Unit	
Nominal Pressure	Operating between	0- 6 Bar(g)	
Maximum Pressure	Must withstand at least	10 Bar(g)	
Temperature		15 to 70 °C	
Accuracy		1.0 % FS or better	
Repeatability:		0.5 % reading or better	
Protection		as per IP-65	
Response time		< 1 sec	
Power Supply		24V DC Loop Power supply	
Output signal		4-20 mA	
Accessories	Direct Mounting three-way valve manifold for calibration, maintenance & over range protection purpose		

Table 9: Pressure Indicator Cum Transmitter Specifications

4.8 Technical Specifications Cable for instrumentation

Cables shall be supplied for instrumentation signal transmission and field connectivity requirements.

Specification Name	Detail	Required Value	Bidders comment & compliance notes
No. of strands/ strand diameter		19/ 0.16mm SPC	
Inner conductor	silver plated copper wire		
Conductor diameter		0.81 mm +/- 0.03 mm	
Diameter of core including insulation		1.17 to 1.37mm	
Thickness of insulation		0.25+/-0.05mm	
No. of cores		2 and 4	
Core colors	Different Preferred to identify them separately		
Core insulation	Twisted & Spiral Wrapped and fused PTFE tape		
Insulation rating		3 KV for 1 second, 600V AC continuous, Type E	
Resistance per 100 meters		5Ω or less (at 20°C)	
Filler material/ Isolator	PTFE		

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Screening Coverage/ Screening material	with Silver plated Copper	>95%	
Sheath thickness		0.25 +/- 0.05mm	
Sheath color	Grey/White		
Temperature rating		-65 to 200° C	
Standards	JSS 51038/ MIL-DTL- 27500H		
Application	Fluid Temperature Measurement		

Table 10: Instrumentation Cable Specifications

5. Prefabrication & Quality Control

- ✓ Random inspection may be organized by ITER-India for inspecting the quality of procured material/components and observation of fabrication processes for SS Structure & Pipe Assembly.

5.1 Material Requirements

Unless otherwise specified, all manifold assemblies, piping, fabricated supports, flanges, fittings, and associated structural components shall be manufactured from **SS304 stainless steel**. Components requiring enhanced corrosion resistance or supplied as standard OEM items, such as valves, instrumentation, threaded fittings, and other specified accessories, may be manufactured from **SS316**, where specified in the BOQ, technical specification, or approved drawings. Material substitution shall not be permitted without prior written approval from ITER-India.

The supplier shall provide material traceability documents, such as Material Test Certificates (MTCs), stockist certificates, or Certificates of Conformance (CoC), as applicable, for major pressure-retaining components. Where original manufacturer's MTCs are unavailable due to procurement below the manufacturer's MOQ or through authorized stockists, equivalent traceability documentation acceptable to ITER-India shall be submitted.

5.2 Welding and Non-Destructive Testing (NDT)

All welding of stainless-steel piping and fabricated manifold assemblies shall be carried out exclusively using the Gas Tungsten Arc Welding (GTAW/TIG) process.

Welding shall be performed in accordance with qualified Welding Procedure Specifications (WPS) supported by valid Procedure Qualification Records (PQR), and only qualified welders possessing valid Welder Performance Qualification (WPQ/WQT) certificates shall be deployed for fabrication in accordance with ASME BPVC Section IX.

All completed welds shall undergo 100% Visual Inspection (VT). In addition, a minimum of 10% Radiographic Testing (RT) shall be carried out on circumferential butt welds. Radiographic examination shall be performed by a NABL-accredited laboratory in accordance with ASME BPVC Section V, and the acceptance criteria shall comply with ASME B31.3.

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Any weld found unacceptable shall be repaired and re-examined until acceptable results are achieved.

Hydrostatic testing of the fabricated manifold assembly shall be carried out at 9 bar after completion of fabrication.

The supplier shall submit quality assurance records applicable to the scope of fabrication, including welding qualification documents (WPS, PQR, WPQ certificates), hydrotest reports, RT reports (where specified), material traceability records (where applicable), and other relevant inspection records during Factory Acceptance Testing (FAT) and Pre-dispatch Inspection (PDI). The extent of documentation shall be commensurate with the scope and complexity of the fabrication work and shall be subject to acceptance by ITER-India.

6. FAT, Pre-dispatch Inspection & Dispatch Clearance

- ✓ Supplier has to demonstrate Hydro tests at 9 Bar test pressure on entire assembly of all components (including piping & fittings).
- ✓ A pre-dispatch Inspection may be conducted by ITER-India representative for witnessing the FAT. It is preferable to conduct basic flow tests at factory to ensure that the flow meters along with other instrumentation and valves, to ensure that they are functioning satisfactorily before dispatch. However, if such tests are not feasible at factory, the same will be done at ITER-India site.
- ✓ A dispatch clearance note will be issued by the purchaser after successful completion of the pre-dispatch inspection. Supplier shall initiate the delivery only after receiving the dispatch clearance note from the purchaser.
- ✓ The list of tests and required documents are summarized in Table-11.

S/N	Components	Type of Test	To be witnessed	Documents Required	Bidders comment & compliance notes
1	Piping	Hydro Test	Yes	Test Report	
2	Piping Weld Joints	Radiographic Testing (Minimum 10% RT)		RT Report, Weld Identification/Traceability Record	
3	Fitting	Hydro Test	Yes	Test Report	
4	Valves	Hydro Test	Yes	Test /Inspection Report	
		Specification		OEM data sheet	
5	RTD (Resistant temp. detector)	Physical Inspection	These tests will be conducted at ITER-India site,	Test /Calibration Report	
		Specification		OEM data sheet	

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

6	Flow Indicator cum Transmitter	Physical Inspection	in case, facility isn't available at supplier's end.	Test /Calibration Report	
		Specification		OEM data sheet	
7	Pressure Indicator cum Transmitter	Physical Inspection		Test /Calibration Report	
		Specification		OEM data sheet	

Table 11: List of tests to be performed for respective components and List of documents to be submitted by supplier

7. Final Acceptance

The properly fabricated and assembled structure of the Mini Cooling Manifold will be inspected and tested by **ITER-India**. The following checks will be carried out:

- ✓ **Visual Inspection** – Verification of quantity, dimensions, workmanship, and overall assembly quality.
- ✓ **Performance Tests** – Instrument health check, Hydro test at **9 bar** to detect any leakages, and flow tests to confirm instrument performance.

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

8. CAD schematic for understanding the work-scope

Figure-1 and Figure-2 illustrate the installation arrangement and integration locations of the mini cooling manifold.

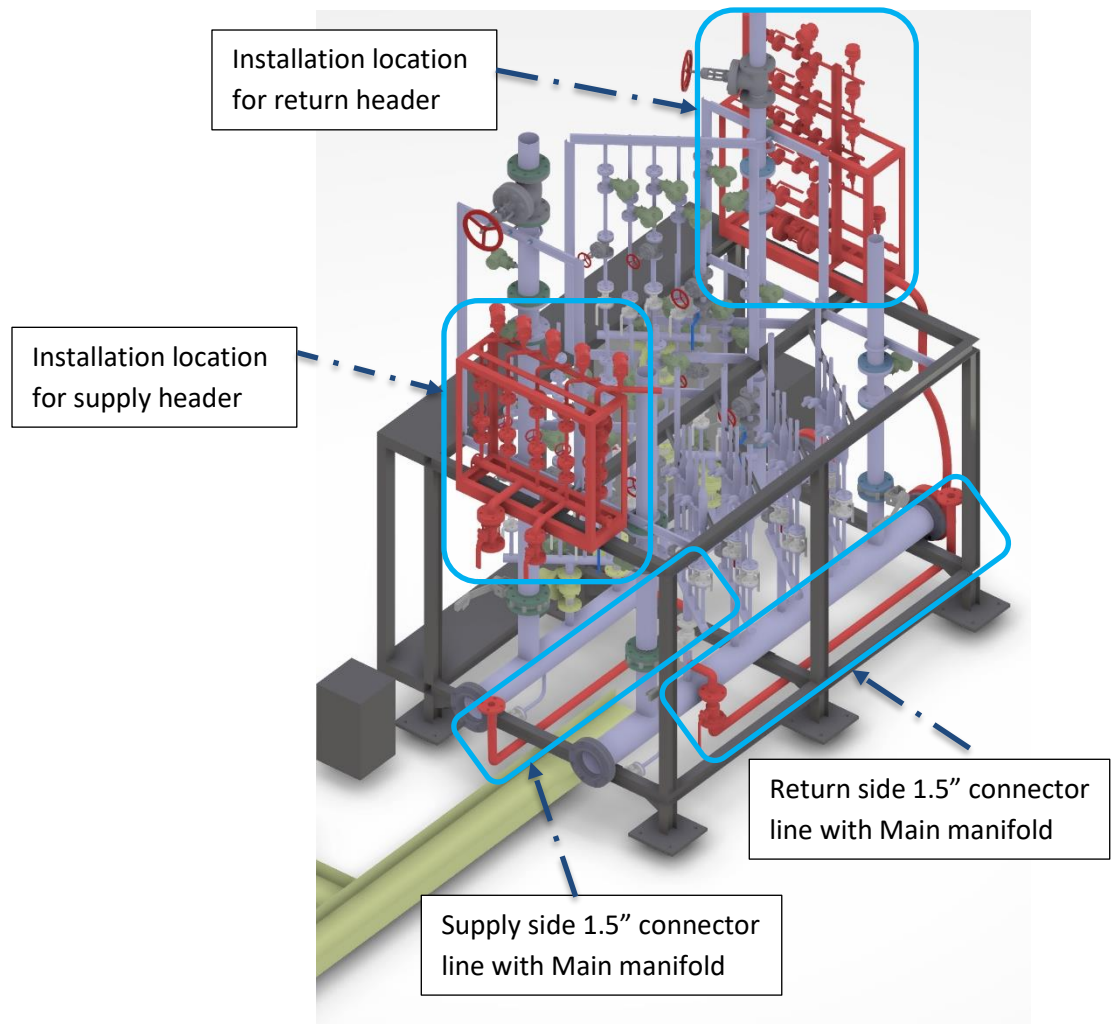


Figure 1: Overall Assembly of Mini Cooling Manifold

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Scope of supply: Red colored model in assembly also shown in isometric view separately.

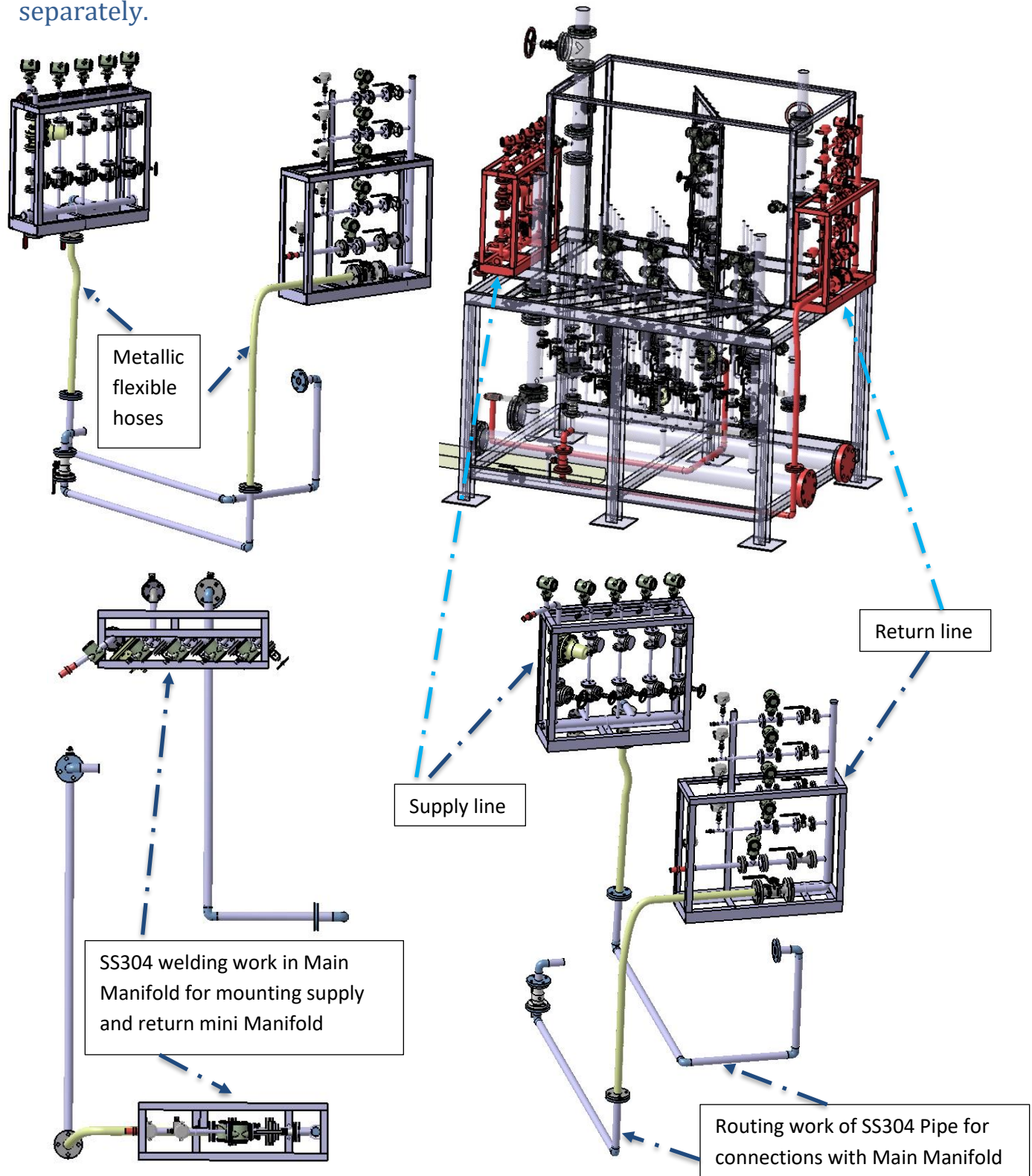


Figure 2: Installation Locations of Supply and Return Headers

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Annexure-1: List of drawings & schematics

S. No.	Description	Page No
1	Supply Manifold-3D view	1
2	Supply frame (Sf)	2
3	Lateral C Channel (F1) + longitudinal C channel (F2) + Vertical L Angle (F3)	3
4	Longitudinal L Channel (F4) + Lateral L angel (F5) + Branch support (F6)	4
5	Supply Mains (Sm)	5
6	1" Supply Branch (S5) and ½" Supply Branch details (S1, S2, S3, S4)	6
7	Return Manifold-3D view	7
8	Return frame (Rf)	8
9	Lateral C Channel (F7) + longitudinal C channel (F8) + Vertical L Angle (F9) + Branch Support 1 (F13)	9
10	Longitudinal L Channel (F10) + Lateral L Channel (F11) + L Support (F12) + Branch support 2 (F14)	10
11	Returns Mains (Rm)	11
12	1" Return Branch (R5) and ½" Return Branch details (R1, R2, R3, R4)	12
13	1.5" Supply Header	13
14	1.5" Return Header	14
15	Frame reinforcement support	15
16	Angle reinforcement support	16

Table 12: List of drawings for the project

	PART-A (II): Scope of supply, scope of work, technical specifications and drawing(s)	GeM bid No.
		GEM/2026/B/7940335

Annexure-1: List of drawings & schematics
