

Annexure-A5 of Part-A(III): Amendment to Part-A(II) and Pre-bid Clarifications

GeM bid No: GEM/2026/B/7687092				
Pre-Bid Queries from the Bidders and ITER-India Clarifications				
Query No.	Ref. Tender Part/ Section No.	Ref. Clause No./Page No.	Description of the query	Response of ITER-India
1	Part-A(II) Technical Specification	Table 2 - Total Requiriements of Coating/ cladding of W over SS	In provided table some of the dimensions for Apex Tiles length are provided as 0 mm. Please clarify required length for these tiles.	The Tiles with dimensions '0' are removed. Revised Table 2 for W cladded/coated tiles & Table 3 for Bulk Tungsten (W) & WHA tiles of Part A (II) is attached in the Corrigendum. (Numbering of Table 2 was inadvertently missed in the Original Tender. Table of 'Total Requirement of W and WHA tiles for TFW project' is to be considered as Table 2.
2	Part-A(II) Technical Specification	Table 3- Total Qty (Nos.) requirement of W and WHA Tiles for TFW project	Provided spare qty. for Bulk Tungsten and WHA is not in-line with document [RD13]. Which shall be followed.	Revised Table 2 & 3 of Part A (II) is attached in the Corrigendum. (Numbering of Table 2 was inadvertently missed in the Original Tender. Table of 'Total Requirement of W and WHA tiles for TFW project' is to be considered as Table 2.
3	Procurement Technical Specification for the Temporary First Wall	5.2.2 Electrical Strap assembly	As ES Central Bolt and Spring washer is required as part of optional quote in Lot-3. Necessary coating scope will be in vendor scope. So coating shall be performed as per which technical specification for these parts?	The Anti Sieze coating on ES Central Bolt and Spring Washers are to be performed as per AD17_Copper_Antiseize_coating_specification_f_TLLFHC_v4_0 provided in the tender document.
4	BKT_TFW_04_EM3P WK_v3	TFW_CENTRAL_BEAM#ANF7XA	As per drawing, part no. 19 MOC is specified as 304L. However, as per provided presentation in Scope Appraisal meeting (Dt. 30-06-2026) it was mentioned as 316L. And no material specification is provided for 304L plate material.	Material for TFW_CENTRAL_BEAM#ANF7XA Central Beam is 304L and the material Specification is AD19 (not mentioned in the tech spec)_Steel_EN_1.4307_(304L)_plates_for_non-DT_G92SYG_v1_1 provided in the tender document.
5	BLKT_ES_BOLT_M24_65_SPEC_HEAD_2M527Y_v7	Note: 4	"Note 4: Component to be compliant with Annex B requirements." Which Annex B compliance is requested for this part.	Read Procurement Technical Specification_EASURR_v2.3 instead of Annex B
6	BLKT_TFW_THREAD ED_BARREL_G6X92F_v1	Note: 7	"Note 7: Insulation coating as per _IDM_D25QF6." Mentioned insulation coating specification is not provided along with RFQ documents.	The insulation coating for Threaded barrel is to be done as per AD18_Insulating_coatings_for_the_blanket_syst_D25QF6_v3_1 provided in the Tender document
7	05_Part A(III)_Additional Terms & Conditions	13.2	Price Variation Formula for the applicable items	No Price Variation will be applicable for this Tender.
8	05_Part A(III)_Additional Terms & Conditions	10.2 Table 1A	T0 reference Date	T0 will be the GeM contract date between ITER-India and the Contractor

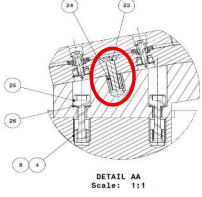
9	02_Part A (II)_Tech Specs	5.8 Vacuum Requirement	What are the outgassing requirements for the TFW Components. What is the maximum allowable outgassing rate for TFW components	The outgassing rates of material used on ITER vacuum system shall be consistent with the values in Table 5-1 of the ITER Vacuum Handbook (ITER_D_2EZ9UM v2.5). The TFW has a Vacuum Classification VQC-1B.
10	05_Part A(III)_Additional Terms & Conditions	11. Free Issue Items	Who will be the importer of the Free Issue Items	ITER-India will be the importer of the Free Issue Items issues by IO or other nominated entity by IO.
11	02_Part A (II)_Tech Specs	Appendix A2	Availability of High Heat Flux Facility. Provide Specs Sheet & Cost sheet for HHFT facility.	IPR will provide access to High Heat Flux Facility for testing of the TFW Components during execution. The rate of the HHFT Facility utilization per sample is INR 300000 + applicable GST.
12	02_Part A (II)_Tech Specs	Appendix A2	What is the frequency of coupon testing and the exact parameters. What will the parameter for deciding the number of coupon testing?	Coupons would need to be tested for W clad/coated tiles. The frequency will be mutually agreed during execution
13	02_Part A (II)_Tech Specs	5. Scope of Work	Any assembly requirement of row assembly or sector assembly.	There are not assembly requirement or trial for any row or sector panels. The assembly is to be done at panel level only
14	Gem Bid Document	Bid Date	Any possible extension on the bid submission date? No.	Extension of bid submission date is not possible due to stringent timelines of bid submission to ITER Organization by ITER-India
15	02_Part A (II)_Tech Specs	5. Scope of Work	What are the prototyping requirements for TFW	Refer Procurement Technical Specification_EASURR_v2.3
16	02_Part A (II)_Tech Specs	Appendix A2	What are the High Heat Flux Testing Requirements	High Heat Flux testing needs to be done for atleast 3 tiles mounted on the finger prototype for both the Lot 1 and Lot 2 Fingers. Not all tiles are required to be mounted for HHF Testing. However, assembly is to be done for full fingers with all components assembled.
17	AD6_Tungsten_heavy_alloy_WNiFe_for_TFW_DUGDDF_v1_0	Document Version	WHA version specs version latest 1.2	Tungsten_heavy_alloy_WNiFe_for_TFW_DUGDDF_v1_2

#	REFERENCE DOCUMENT(S)	Description	Clarification from ITER India
18	Technical Specification (EASURR v2.3)	[REQ-4] Description of the manufacturing processes and their qualification procedures .	Yes, qualification is applicable only to special manufacturing processes, such as copper Anti-seise coating, Insulation coating, and W cladding. Conventional precision machining do not require qualification, while manufacturing trials are recommended.
19	Technical Specification (EASURR v2.3)	[REQ-7] List of Certification of qualified personnel for the manufacturing and examinations.	ASTN certificate is ok (recognized equivalent certifications) via Deviation Request.
20	Technical Specification (EASURR v2.3)	[I] As only three model variants are fully specified in this specification, the remaining 37 models are included within the scope of work for design replication (see Figure 5-8) .	Design replication is limited to the components which are part of scope of supply under this TA. Free issue components are not considered as a part of design replication activity.
21	Technical Specification (EASURR v2.3)	[I] These models are largely identical in design to the three developed models, with differences mainly in poloidal and toroidal span. The designs from TFW04, TFW09, and TFW14 can be replicated using the Configuration models of [AD2] List of variants for the TFW assemblies together with Table 5 2.	Typical guideline for design replication: TFW04 will be used as an example for: -Minor variants of Row 03-04 -Row 01-02 with different Plasma Facing Material (PFC, W cladding than Bulk Tungsten), different tile thickness (12mm than 15mm), and different tile connection (Fixed than Flexible) -Row 05 with different PFC (W cladding than Bulk Tungsten) and different tile thickness (12mm than 15mm) -Row 06 with different PFC (Tungsten Heavy alloy than Bulk Tungsten) and different tile thickness (12mm than 15mm) -Row 18 TFW09 will be used as an example for Row 07-08. TFW14 will be used as an example for Row 10-17, including minor variants of TFW14.
22	Technical Specification (EASURR v2.3)	Figure 5-9 Overview of Temporary First Wall 04 assembly, for illustration only.	Typo correction: Pl. consider "(Pad assemblies (Radial Pad)(×4); Pad assemblies (X- Pad) (×4))." in place of "(Pad assemblies (Radial Pad)(×2); Pad assemblies (X- Pad) (×2))"
23	Technical Specification (EASURR v2.3)	[REQ-17] The Barrel Shim is a customized part, with thickness that shall be machined based on input from the IO (see section 7.1).	The maximum anticipated Barrel Shim thickness is 4.5mm.
24	Technical Specification (EASURR v2.3)	Figure 5-11: Coatings on components of FH of Central Bolt assembly (for information only). Insulation coating in blue; LFC/ASC in yellow.	The coatings in Figure 5-11 on Central Bolt assembly are out of contractor scope.
25	Technical Specification (EASURR v2.3)	[I] The contacting surface to the Electrical Strap Side Block is TFW Electrical Strap pedestal which made of Copper. Alternative copper alloys may be proposed by the DA.	Material Sepcification for "Bulk Copper" is [AD15] Copper plate for non-DT in-vessel usage (DUDS8V v1.2). The same material specification is referred in 2D Drawings for TFW Eelctrical Strap pedestal "081145 - BKT_TFW_Cu_PEDESTAL_ES_14L (https://user.iter.org/?uid=G85F8D)" "081149 - BLKT_FW_Cu_INTERLAYER_ES_10L (https://user.iter.org/?uid=G85LK9)"
26	Technical Specification (EASURR v2.3)	Figure 5-17 Pad assembly for TFW (for information only).	2G4CJM_v4-044163- BKT_STD_FW_PADS---E (https://user.iter.org/?uid=2G4CJM_v4) All drawings from Standard Part Assemblies and Interfaces for TFW (for info)/ https://user.iter.org/?uid=FSND7D are now included in the shared file.
27	Technical Specification (EASURR v2.3)	Figure - 17 Pad assembly for TFW (for information only).	The insulation coating on Pad assembly will be out of contractor scope in case of Free lussed Item. For the Lot 3 (Optional), supply of the Pad assembly, including the insulation coating, which will be part of contractor scope, referring to [A1_REQ-13] in APPENDIX A1
28	Technical Specification (EASURR v2.3)	[I] The spare tiles that are to be provided are considered as "blanks" with standardized dimensions such that they can be located in one of several positions in the machine.	Tile blanks refer to semi-finished tiles, according to drawings (but with oversized poloidal and toroidal dimensions as per the variant table values [AD2]) with bolt through holes and their chamfering, no chamfering on the tile edges.

29	Technical Specification (EASURR v2.3)	[I] After components are delivered to ITER site, IO will carry out the Site Acceptance Tests (SAT) of TFW as detailed in Section 5.13.	No contractor activities are expected during SAT of TFW at ITER site.
30	Technical Specification (EASURR v2.3)	[REQ-33] A prototype of one full-scale finger , representative of the most complex finger to be manufactured, shall be produced prior to MRR and subjected to dimensional inspection and high heat flux testing, according to requirements in Section 5.12 and Appendix A2.	There shall be one full scale finger per Lot per supplier . This means: Lot 1 will be finger prototype with PFM of bulk W, and Lot 2 for finger prototype with W clad tiles. The full scale finger shall include the finger support.
31	Technical Specification (EASURR v2.3)	[REQ-36] A descriptive document of the manufacturing processes and their qualification procedures shall be provided for IO acceptance.	Qualification is applicable only to special manufacturing processes, such as copper Anti-seise coating, Insulation coating, and W cladding.
32	Technical Specification (EASURR v2.3)	[REQ-42] In case of using Electric Discharge Machining (EDM), in particular Wire Electric Discharge Machining that uses Brass wire as the electrode, the surface of the component shall be cleaned, in order to comply with the requirement specified in the [AD3] <i>ITER Vacuum Handbook</i> . The process shall be qualified to demonstrate that an acceptably contamination free surface has been produced.	The final surface finish is needed both for vacuum quality as well as to avoid plasma contamination. Cleaning processes such as chemical or mechanical process are frequently used. The first step is to confirm the contamination due to EDM is removed by SEM with EDS. If the chemical process is selected, wipe test and outgas test are required (in this case, IO can accept samples for testing). If the mechanical process such as grinding is selected, PT to demonstrate absence of surface damage is required.
33	Technical Specification (EASURR v2.3)	[REQ-47] In addition to the baking requirements specified in [AD3] ITER Vacuum Handbook, the TFW steel components shall be subject to high-temperature baking (up to 550 °C) for long duration (up to 48 hrs) to reduce outgassing during operation. This may be performed by parts before the assembly of the TFW panels.	[REQ-47] specify baking requirements on steel components only (removal of hydrogen from SS), which shall be subject to higher temperature/longer duration before assembled to TFW. Alternative baking temperature/duration (lower temperature up to 425 °C/longer duration) may be proposed by the contractor. (i) (iii) baking requirements are referring to [REQ-101] (ii) baking before W cladding (coating) is part of contractor scope to ensure quality of W cladding (coating) (iv) FII will be baked with suitable package for delivery (not in scope of contractor) (v) No baking will be required on spare tiles nor raw material, while baking is required for spare bolt connection (including bolt/screw/washer/spacer...), baking details referring to [REQ-101]. (vi) W/WHA tiles are baked as a part of the TFW assembly according to [REQ-101]. See No. 27. (vii) Clad steel tiles, being steel, are subject to a high-temperature bake according to [REQ-47]. This shall be done after coating/cladding.
34	Technical Specification (EASURR v2.3)	Table 5-4: TFW Material Specifications (Steel 304L)	Both 304L plates and forging are acceptable for manufacturing of the central beam.
35	Technical Specification (EASURR v2.3)	[REQ-72] The DA shall perform the above activities in a calibration laboratory accredited to [CS8] <i>ISO 17025</i> , which may be the DA's own or external.	Proposal of other international standards for accreditation shall be demonstrated the equivalence in Deviation Request and be subject to IO approval.
36	Technical Specification (EASURR v2.3)	[REQ-74] NDT personnel shall be qualified and certified in accordance with the standard [CS5] <i>EN ISO 9712</i> except for direct visual examination (if the inspector has a qualification in another NDT method, IO accept it as qualification for visual testing).	ASTN certificate is ok (recognized equivalent certifications) via Deviation Request.
37	Technical Specification (EASURR v2.3)	[REQ-78] The DA shall ensure that the personnel who perform and evaluate the non-destructive examinations are qualified and certified in accordance with the standard [CS5] <i>EN ISO 9712</i> .	ASTN certificate is ok (recognized equivalent certifications) via Deviation Request.

38	Technical Specification (EASURR v2.3)	[REQ-101] Before final packaging, all TFW components and subcomponents shall be baked in accordance with approved procedures base on Section 26.2 of the [AD3] <i>ITER Vacuum Handbook</i> . A report of the baking shall be provided including time, temperature and vacuum level in plots.	Baking in parts are mainly on Steel Componets with higher tempature and longer duration. Baking of complete assembly is mandatory at 240°C for 24 hours. Baking of TFW subcomponetns (such as bolt connection other than SS blanks) is mandatory at 240°C for 24 hours. Spare tiles do not require baking, as they will be baked after final machining at IO. (i) Table 26-1 in Section 26.3 of the vacuum handbook provides the baking temperature for each component material. For steel, a temperature of 240C is acceptable, while for Tungsten (and by extension WHA) the temperature is 350C. Then it is stated "where the temperature is too high for a composit assembly, the component part requiring higher temperature baking shall be baked at that temperature prior to assembly and then the complete assembly baked at the lowest listed tempratarute of the component parts." (ii) Electrical straps and Barrel (Al Bronze) are to be baked at minimum 240C.
39	Technical Specification (EASURR v2.3)	APPENDIX A1 – ELECTRICAL STRAP AND PAD REQUIREMENTS	The Lot-3 includes both Electrical Strap and PAD assembly (drawing no. 044163 --E). For Electrical Strap, DA shall supply components manufacutred according to drawing no. 055877 --B and 055879 --B as shown in Figure A1_1. Item no. 3 to 5 of drawing no. 080404 are FII for TFW (out of contractor scope). Item no. 6 (TFW Cu pedestal) of drawing no. 080404 is part of Lot 1 or Lot 2.
40	Technical Specification (EASURR v2.3)	[A1_REQ-13] The TFW Pad shall be coated by the DA with qualified EIC as per [AD18] <i>Insulating coatings for the blanket system components</i> on it bottom and side surfaces to be electrically insulated from the TFW central beam. See Figure 5 17 for illustration and 2D drawing through [AD2] <i>List of variants for the TFW assemblies</i> .	Thickness of the insulation coating is specified in 2D drawing, "Thickness of Alumina coating (Al2O3) as a part of EIC shall be in range of 0.25-0.45mm". Referring to Note 9 in drawing 044163 - BKT_STD_FW_PADS (https://user.iter.org/?uid=2G4CJM_v4);
41	Technical Specification (EASURR v2.3)	[I] This Appendix is the functional specification of Tungsten (W) cladding to define requirements for qualification and production of Tungsten cladding on 316L Stainless Steel plates for tiles used in ITER Temporary First Wall panel, including High Heat Flux (HHF) testing. W cladding includes W coating. [I] This Appendix also describes the requirements for HHF testing of TFW finger prototype.	Cladded tiles must be HHF tested as a part of the cladding qualification, and can be done with the tile only (not needing to be attached to a finger). See [A2_REQ_6]. Then cladded tiles must be HHF tested during production according to [A2_REQ_5]. At least 3 tiles mounted on each finger prototype must be HHF tested as a part of finger qualification to confirm the behaviour of the finger mechanical attachments under thermal loading. See [A2_REQ_7]. For lot 1, the selected tiles for HHFT should be Tungsten. Annex 2 specifies two topics: (1) requirements for qualification of cladded tiles, and (2) requirements for finger qualification. For the second part (finger qualification), it is required to use Tungsten tiles for HHFT of Lot 1 because the purpose of the test is to check the performance of the mechanical attachments up to their highest expected operational temperatures. Using WHA tiles will limit the maximum testing temperature, so W is instead required. This was not clearly specified in the tech spec.
42	Technical Specification (EASURR v2.3)	[A2_REQ_1] Two W cladded steel plates /technology /DA shall be manufactured from [AD9] Steel EN 1.4404 (316L) plates for non-DT in-vessel usage and from the relevant requirements within [AD5] Bulk tungsten for TFW in accordance with the requirements herein. For coating, chemical compositions of tungsten source plates or powder shall meet the requirements of [AD5] Bulk tungsten for TFW.	
43	Technical Specification (EASURR v2.3)	Table A2_1: Examination of W cladding coupons and tiles (Microscopic examination)	The aims of exanimation of coupon are to check the phase formation and the thickness variation of phase and cladding at the cross sectional view by SEM (sub-µm) and optical microscope (50 µm). The examination of coupon at top surface is foreseen by optical microscpe. The examination of tiles at the edges and around bolt holes is foreseen by optical microscope.

44	Technical Specification (EASURR v2.3)	Table A2_1: Examination of W cladding coupons and tiles (Dimension Inspection)	The thickness at coupon surface shall be measured at cross section by microscope. The thickness at tiles shall be measured after the HHF test at cross section, by microscope. During qualification, measurements shall capture the distribution within a tile and within a batch (exact number of locations is to be agreed with IO). During production, sampling shall be performed on coupons.																																																																																																																				
45	Technical Specification (EASURR v2.3)	Coating of W / WHA on SS	Requirements are functional: the cladding must survive the testing campaign. The chamfer itself is non-functional, with no control on coating in this area. Non-functional means that there are no required measurements, nor adhesion requirements in the chamfer.																																																																																																																				
46	Technical Specification (EASURR v2.3)	Grade of Stainless Steel for SS based for Cladded Tiles.	Steel EN 1.4404 (316L) plates for non-DT in-vessel usage (38GK6Z v1.6) (Provided along with tender)																																																																																																																				
47	Technical Specification (EASURR v2.3)	The number of variants for the Central Beam in the Panels	There are approximately 34 central beam variants, to be confirmed during the design replication to the 40 TFW panel variants.																																																																																																																				
48	Technical Specification (EASURR v2.3)	Pls specify the material (Tungsten or Tungsten Heavy Alloy) required for Spare Tiles?	Material is specified in column B of the "Spare Parts" tab of the Variants table [AD2].																																																																																																																				
49	Technical Specification (EASURR v2.3)		All spare tiles are assumed to be Tungsten or WHA. No spares for W coated / cladded tiles																																																																																																																				
50	Technical Specification (EASURR v2.3)	Prototpye finger	Lot 1 will be finger prototype with PFM of either bulk W or WHA (both are acceptable), and Lot 2 for finger prototype with W cladded tiles.																																																																																																																				
51	Technical Specification (EASURR v2.3)	APPENDIX A2																																																																																																																					
52	Bulk tungsten for TFW (DUDN9C v1.0)	Table 1 Chemical composition of tungsten plates: In the material specification of tungsten, it's requested '+10% relative' for permissible variation in check analysis of O content. There is an additional 'relative' for O content compared with other composition.	The "+10% relative" of O content is described in Table 1 of Standard B760-07 (2013). In material certificate, the value of 0.011 is acceptable for measured O content. <table><tr><th colspan="3">Table 1 - Chemical composition of tungsten plates</th></tr><tr><th>Element</th><th>Composition max, wt. %</th><th>Permissible variation in Check analysis, wt. %</th></tr><tr><td>C</td><td>0.010</td><td>±0.002</td></tr><tr><td>O</td><td>0.010</td><td>+10% relative</td></tr><tr><td>N</td><td>0.010</td><td>+0.0005</td></tr><tr><td>Fe</td><td>0.010</td><td>+0.001</td></tr><tr><td>Ni</td><td>0.010</td><td>+0.001</td></tr><tr><td>Si</td><td>0.010</td><td>+0.001</td></tr></table>	Table 1 - Chemical composition of tungsten plates			Element	Composition max, wt. %	Permissible variation in Check analysis, wt. %	C	0.010	±0.002	O	0.010	+10% relative	N	0.010	+0.0005	Fe	0.010	+0.001	Ni	0.010	+0.001	Si	0.010	+0.001																																																																																												
Table 1 - Chemical composition of tungsten plates																																																																																																																							
Element	Composition max, wt. %	Permissible variation in Check analysis, wt. %																																																																																																																					
C	0.010	±0.002																																																																																																																					
O	0.010	+10% relative																																																																																																																					
N	0.010	+0.0005																																																																																																																					
Fe	0.010	+0.001																																																																																																																					
Ni	0.010	+0.001																																																																																																																					
Si	0.010	+0.001																																																																																																																					
53	Technical Specification (EASURR v2.3)	[REQ-47] In addition to the baking requirements specified in [AD3] ITER Vacuum Handbook, the TFW steel components shall be subject to high-temperature baking (up to 550 C) for long duration (up to 48 hrs) to reduce outgassing during operation. This may be performed by parts before the assembly of the TFW panels.	1) It is to be noted that Electrical Straps which made by CuCrZr are not to be baked at 550°C (or 500°C) 2) The final bake is mandatory to improve cleanliness of the completed TFW assembly just prior to shipping.																																																																																																																				
54		Thread machining method of bolt.	The threads of bolts for TFW can be machined by cut or rolled.																																																																																																																				
55		The materials of NORDLOCK: For the 078194 Assembly Drawing, the "part number" of the NORDLOCK_NL8SS-254_STAINLESS_STEEL_254_SMO and NORDLOCK_NL10SS-254_STAINLESS_STEEL_254_SMO indicated the material is 254SMO, which is different from the "Material" 304L specified in the table.	The material 254 SMO® can be used as COTS (Commercial Off-the-Shelf), procurement from standard catalog of NORDLOCK. Typo correction in BOM table (Lines 27 & 28) in the 078194 Assembly Drawing Was: 304L Should be: 254 SMO® <table><tr><th>Item</th><th>Part Number</th><th>Revision</th><th>Material</th></tr><tr><td>1</td><td>TFW INNER TILE ANCHOR</td><td>-D</td><td>Tungsten</td></tr><tr><td>2</td><td>BOLT TFW TONGUE PLATE V8642</td><td>-D</td><td>Tungsten</td></tr><tr><td>3</td><td>BOLT TFW TILE BOLT SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>4</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>5</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>6</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>7</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>8</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>9</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>10</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>11</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>12</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>13</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>14</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>15</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>16</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>17</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>18</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>19</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>20</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>21</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>22</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>23</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>24</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>25</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>26</td><td>BOLT TFW TONGUE ANCHOR SUPPORT V8642</td><td>-A</td><td>Alloy 718</td></tr><tr><td>27</td><td>NORDLOCK_NL8SS-254_STAINLESS_STEEL_254_SMO</td><td>-A</td><td>254 SMO</td></tr><tr><td>28</td><td>NORDLOCK_NL10SS-254_STAINLESS_STEEL_254_SMO</td><td>-A</td><td>254 SMO</td></tr></table>	Item	Part Number	Revision	Material	1	TFW INNER TILE ANCHOR	-D	Tungsten	2	BOLT TFW TONGUE PLATE V8642	-D	Tungsten	3	BOLT TFW TILE BOLT SUPPORT V8642	-A	Alloy 718	4	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	5	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	6	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	7	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	8	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	9	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	10	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	11	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	12	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	13	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	14	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	15	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	16	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	17	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	18	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	19	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	20	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	21	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	22	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	23	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	24	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	25	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	26	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718	27	NORDLOCK_NL8SS-254_STAINLESS_STEEL_254_SMO	-A	254 SMO	28	NORDLOCK_NL10SS-254_STAINLESS_STEEL_254_SMO	-A	254 SMO
Item	Part Number	Revision	Material																																																																																																																				
1	TFW INNER TILE ANCHOR	-D	Tungsten																																																																																																																				
2	BOLT TFW TONGUE PLATE V8642	-D	Tungsten																																																																																																																				
3	BOLT TFW TILE BOLT SUPPORT V8642	-A	Alloy 718																																																																																																																				
4	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
5	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
6	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
7	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
8	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
9	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
10	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
11	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
12	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
13	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
14	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
15	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
16	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
17	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
18	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
19	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
20	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
21	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
22	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
23	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
24	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
25	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
26	BOLT TFW TONGUE ANCHOR SUPPORT V8642	-A	Alloy 718																																																																																																																				
27	NORDLOCK_NL8SS-254_STAINLESS_STEEL_254_SMO	-A	254 SMO																																																																																																																				
28	NORDLOCK_NL10SS-254_STAINLESS_STEEL_254_SMO	-A	254 SMO																																																																																																																				

56		The standard of CYLINDER SCREW For the CYLINDER SCREW, drawing and the model require the dimensions to comply with DIN 6912. Since DIN 6912 refers to Hexagon Socket Thin Head Cap Screws with Pilot Recess, and the shape of the drawing and the model is not consistent with this.  Cylinder Screw of TFW_09 (Hexagon socket countersunk head screw)	Read DIN7991 in place of DIN6912. Typo correction for the standard of CYLINDER SCREW in drawing and the model Was: DIN6912 Should be: DIN7991
57	Technical Specification (EASURR v2.3)	[REQ-119] One tri-axial accelerometer per each batch of products shipped shall be used. [I] A 3 -directional ShockLog 298 accelerometer, is preferred.	The accelerometers used during transportation shall be fitted onto packed box and shall be capable of recording the acceleration along three perpendicular directions, to monitor shock and vibration based on acceleration or velocity measurements, to precisely analyze the transport environment your packages will encounter, including shipping lifting and handling operations.
58	Technical Specification (EASURR v2.3)	[REQ-20] Two subcomponents of Electrical Strap assembly, specifically the Hexagon Head Bolts and ES Pedestal (red highlighted items in Figure 5 15), shall be supplied by DA. These in accordance with [AD2] <i>List of variants for the TFW assemblies</i> .	Please find below IDM links of material specification: - Hexagon Head Bolts, Steel 660: Steel EN 1.4980 (660) for non-DT in-vessel usage (38GK5G v1.6) - ES Pedestal, Copper: Copper plate for non-DT in-vessel usage (DUDS8V v1.2) The material specification for Hexagon Head Bolts and ES Pedestal are specified in note of 2D drawing: - 081147 - HEXAGON_HEAD_BOLT_BS_4190_M12X178 (https://user.iter.org/?uid=G85B7V) - 081145 - BKT_TFW_Cu_PEDESTAL_ES_14L (https://user.iter.org/?uid=G85F8D) (all these drawings are provided with the tender specification)
59	Technical Specification (EASURR v2.3)	[REQ-92] Factory Acceptance Tests (FAT) shall be conducted for the Temporary First Wall assemblies and Spare components, including: •Visual examination •[REQ-93] Dimensional examination shall be conducted for the Temporary First Wall panels and Spare components in accordance with the Dimensional Inspection Plan. A dimensional check of the Temporary First Wall assemblies shall also confirm that the added parts like barrel, straps and pads are properly installed. •A record of the as-built position of the tags for robot vision.	Using a camera and take pictures of TFW full central slot is required for record of the as-built position of the tags for robot vision. The detail method and tools will be further defined by IO when it will mature. In case of other tools than camera, IO could provide tools to DA for recording. The tags for robot vision are marks which are laser engraved, they cannot be checked by conventional dimensional inspection including laser scan.
60	Technical Specification (EASURR v2.3)	[REQ-106] The DA shall design and supply appropriate packaging, adequate to prevent damage during shipping and handling operations.	The design inputs (gravity or acceleration conditions for Truck & sea transporations) for packaging could be available after TFW Final Design Review or after model approved based on contractor design replication. They will be ready before manufactruing of TFW (well in advance for packaging and shipment).

61	Technical Specification (EASURR v2.3)	[REQ-101] Before final packaging, all TFW components and subcomponents shall be baked in accordance with approved procedures based on Section 26.2 of the [AD3] ITER Vacuum Handbook. A report of the baking shall be provided including time, temperature and vacuum level in plots.	No baking will be required on raw material nor spare tiles for TFW. According to [REQ-101], baking shall be done "before final packaging" to improve cleanliness of the completed TFW assembly just prior to shipping. This is also applied on TFW subcomponents (spare bolt connection, including bolt/screw/washer/spacer...).
			TFW subcomponents are spare bolt connection, including bolt/screw/washer/spacer...
62	Technical Specification (EASURR v2.3)	[REQ-39] The assembly of TFW at the factory shall be performed in a suitably clean area which is compatible for handling VQC-1B components. [REQ-47] In addition to the baking requirements specified in [AD3] ITER Vacuum Handbook, the TFW steel components shall be subject to high-temperature baking (up to 550 C) for long duration (up to 48 hrs) to reduce outgassing during operation. This may be performed by parts before the assembly of the TFW panels.	[REQ-39] is not only for tungsten cladding (coating), but also for TFW full scope, as part of good practice for supply of vacuum components, referring to Section 24 of IVH. Clad steel tiles, being steel, are subject to a high-temperature bake according to [REQ-47]. This shall be done after tungsten cladding (coating).
63	Technical Specification (EASURR v2.3)		Applicability of Buffer Layer Materials for W Coating: In order to prevent coating delamination caused by the difference in thermal deformation between the base material (SUS) and the W coating under repetitive thermal shock conditions, a buffer layer with a thickness within approximately 1/10 of the total coating thickness is proposed to be applied between the base material and the W coating. Candidate materials for the buffer layer: metallic materials such as Ti, Cr, Ta, etc. Regarding to Ta, the chemical composition shall be within 0.01 wt.% as specified in material specification of Tungsten (Bulk tungsten for TFW (DUDN9C v1.0)). Similar like Ta, for the interlayer the requirements for impurity elements, i.e. Co (<0.05wt%), Nb (<0.01wt%) shall be observed.
64		Cladding / coating	Yes, it's possible to apply castellation in W cladded tiles. In case of castellation, the method for W castellation/sub-tile machining (and cleaning after castellation/machining if any) and the planned gap for castellation shall be provided for acceptance.
65		Cladding / coating	It is possible to use WHA instead of W in W cladding tile.
66			It is acceptable to use a slight chamfer (min 0.5mm chamfer) instead of a radius of 3mm on W cladded tiles.
67	Technical Specification (EASURR v2.3)	Appendix A2: Cladding / coating	There are no requirements for density nor porosity for cladding, as outgassing will be performed during FAT and subsequently during in-vessel baking. Instead requirements are focused on the adhesion of W cladding/coating.
68	Technical Specification (EASURR v2.3)	Bullet 4.3 : Applicable Edition of ASME Code as per CS10 & CS11. Also to confirm in CS10 that applicable chapter within NG listed here is 2542	ASME Code Edition 2017 for CS10 & CS11. CS10 was: ASME Section III, Division 1, Subsection NG-254 CS10 should be: ASME Edition 2017 Section III, Division 1, Subsection NG-2542 This is ASME Code specified for [A1_REQ-6] New Code to be added: [CS16] ASME Edition 2017 Section III, NG-2582 This will be ASME Code specified for [REQ-52]
69	Technical Specification (EASURR v2.3)	Figure 5-29	The material for captive spacer (thickness of 4mm) is SS316L, following material spec: [AD10] Steel 14404 grade 316L Plates less 5 mm (ITER_D_U8M5ZZ)
70	Technical Specification (EASURR v2.3)	[REQ-33] A prototype of one full-scale finger, representative of the most complex finger to be manufactured,	The supplier shall identify which finger is the most complex to manufacture for the specified tolerances, for agreement by the ITER India / IO.

71	Technical Specification (EASURR v2.3)	5.8 Vacuum Requirements	For the known and standard materials (who are accepted in IO Vacuum) are already in compliant with the vacuum requirements. Therefore, adherence to the approved "clean work plan" is considered to be enough to ensure compliance with vacuum compatibility requirements, with special reference to the outgassing rates.
72	Technical Specification (EASURR v2.3)	Coatings details	TFW04. Drawing 78194: Pos.7 BKT_TFW_TILE_NUT#F3JHPK: ASC TFW04. Drawing 78194: Pos.17 BKT_INSERT_M10_M18_15#G4RT3H: ASC TFW04. Drawing 78194: Pos.22 CYLINDER_HEAD_SCREW_DIN_6912_M10X25#G76EB: ASC TFW04. Drawing 78194: Pos.26 CYLINDER_HEAD_SCREW_DIN_6912_M8X25#G76ED9: ASC TFW04. Drawing 080404: Pos.18 BLKT_TFW_THREADED_BARREL: EIC Applicable to corresponding parts for all TFWs
73		SS material for prototype	It's ok to use off-the-shelf (commercially available in the market) material of SS04L and SS316L for manufacturing of Finger Prototype and Tungsten clad tiles for qualification.
74	Technical Specification (EASURR v2.3)	[REQ-119] One tri-axial accelerometer per each batch of products shipped shall be used. [I] A 3 -directional ShockLog 298 accelerometer, is preferred.	The Shocklog 298 accelerometer is preferred as it's commonly used by IO. IO has the software to extract and analyze the data. Other accelerometers with similar capabilities (tri-axial direction, waterproof enables its use outdoors, and software for data extraction and analysis) are acceptable. The waterproof version of ASPION G-Log and G-Log 2 are acceptable for use. The classic ASPION G-Log data logger is not allowed as it's particularly suitable for use inside transport packaging.
75	Technical Specification (EASURR v2.3)	APPENDIX A2 [A2_REQ_1] and [A2_REQ_1]	It's acceptable for any cladding technology which can meet functional specification, except [REQ-41] Vacuum brazing for W cladding onto SS is not allowed because we restrict the use of brazing and low-melt temp layers due to risk of melting this layer during high-temperature excursions of the tiles. [I] This Appendix is the functional specification of Tungsten (W) cladding to define requirements for qualification and production of Tungsten cladding on 316L Stainless Steel plates for tiles used in ITER Temporary First Wall panel, including High Heat Flux (HHF) testing. W cladding includes W coating.
76	Technical Specification (EASURR v2.3)	[REQ-61] Each TFW material shall be in accordance with the specified applicable document in Table 5-4.	
77	Technical Specification (EASURR v2.3)	[I] Three main bolt locking systems are used for TFW: self-locking thread, locking washer, and for the ES side bolts, physical plates. The type of locking system to be used for a specific bolt system is presented in the corresponding assembly drawing.	Self locking requirements are applicable to : TFW04. Drawing 78194: Pos.7 BKT_TFW_TILE_NUT#F3JHPK TFW04. Drawing 78194: Pos.17 BKT_INSERT_M10_M18_15#G4RT3H TFW09. Drawing 73940: Pos.17 BKT_TFW_TILE_NUT#F3JHPK TFW09. Drawing 73940: Pos.24 BKT_INSERT_M10_M18_15#G4RT3H TFW14. Drawing 79938: Pos.3 BKT_TFW_TILE_NUT#F3JHPK TFW14. Drawing 79938: Pos.10 BKT_INSERT_M10_M18_15#G4RT3H Applicable to corresponding parts for all TFWs
78	BKT_TFW_09_FRWJD7_v2 BKT_TFW_14_G8CP6B_v2	CYLINDER_HEAD_SCREW_DIN_6912_M10X25_VH#FAJVYM , Steel 8.8	The screw materials specified for GAD 09 and GAD 14: Read "A4-80: Austenitic steel strength class 80" instead of 'Steel 8.8'

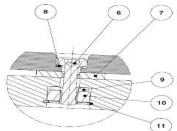
79	BKT_TFW_09_FRWJD7_v2 BKT_TFW_14_G8CP6B_v2 BKT_TFW_04_EM3PWK_v3	See BOM of GADs.	Recommended standards for fastners: TFW04. Drawing 78194: Pos.3 BKT_TFW_TILE_BOLT_M8#EYSRKW : DIN 7984 (or DIN 6912) with reduced shank diameter TFW04. Drawing 78194: Pos.4 BKT_TFW_SPRING_WASHER_M12#FV4MVS: DIN 2093. SCHNORR® catalog article Num. 008 100 TFW04. Drawing 78194: Pos.6 BKT_TFW_SPRING_WASHER_M8#F24353: SCHNORR® load washer DIN 6796 for M8 TFW04. Drawing 78194: Pos.11 BKT_BOLT_M14x60#G7DMV: DIN 912 (ISO 4762) with reduced shank diameter TFW04. Drawing 78194: Pos.12 BKT_TFW_SCHNORR_WASHER_M14#G7DMPN: SCHNORR® safety whasre type "VS" for M14 TFW04. Drawing 78194: Pos.16 CYLINDER_H_SCREW_DIN6912_M10X45_VH#FCQNR: DIN 7991 TFW04. Drawing 78194: Pos.18 CLAMPING_PIN_ISO_8752_5X20#EBYSJJ: ISO 8752 TFW04. Drawing 78194: Pos.22 CYLINDER_HEAD_SCREW_DIN_6912_M10X25#G76EBA: DIN 912 (DIN 6912 not advised) TFW04. Drawing 78194: Pos.26 CYLINDER_HEAD_SCREW_DIN_6912_M10X25#G76EBA: DIN 912 (DIN 6912 not advised) TFW04. Drawing 78194: Pos.27 NORDLOCK_NL8SS-254_STAINLESS_STEEL_254_SMO#AP7NKH: Nord-Lock stainless-steel wedge-locking washers, NL8ss-254 for M8 TFW04. Drawing 78194: Pos.28 NORDLOCK_NL8SS-254_STAINLESS_STEEL_254_SMO#AP7NKH: Nord-Lock stainless-steel wedge-locking washers, NL8ss-254 for M10 Applicable to corresponding parts for all TFWs
80			The captive washer has threaded hole M8.
81			Inner diameter in the finger plate shall be manufactured in accordance with requirement of DIN 472 for corresponding circlip. The IO proposal is to use circlip D21.5 and hole D20. 7 is the 1.CAPTIVE SPACER, 11 is the CIRCLIPS 
82		acceptance criteria (including HHF testing) for the coated tiles	Acceptance criteria of WHA cladding SS tiles under HHF testing is no indication of delamination nor melting. We do not expect melting of WHA in the given temperature range and power density in the HHF testing unless the bonding is poor. Melting is not foreseen.
83	Technical Specification (EASURR v2.3)	[A2_REQ_5] The W cladding coupons shall be manufactured during production phase. Both coupon production rate and testing rate shall be agreed with the IO.	The coupon is required since it is difficult to perform reliable NDT for W cladding tiles. Our strategy is to defined high coupon production rate and high testing rate at the early stage of production and then reduced rates at the later stage of production. The rates shall be linked to the size of manufacturing batches. The definition of batch size shall be agreed when the manufacturing technology and facility are clarified.

Table-3 Total requirement of W and WHA Tiles for TFW project (For Lot-1)

		Apex Tiles				Inner Flat Tiles				Outer Flat Tiles			
Row No.	Material	Apex tile length [mm]	tile pol height [mm]	Tile Thickness [mm]	Qty apex tiles	inner tile length [mm]	tile pol height [mm]	Tile Thickness [mm]	Qty inner tiles	outer tile length [mm]	tile pol height [mm]	Tile Thickness [mm]	Qty outer tiles
03-04	Tungsten	130	60	15	32	128	60	15	64	122	60	15	64
03-04	Tungsten	130	60	15	96	128	60	15	192	122	60	15	192
03-04	Tungsten	130	60	15	896	128	60	15	1792	122	60	15	1792
03-04	Tungsten	130	60	15	32	128	60	15	64	122	60	15	64
03-04	Tungsten	130	60	15	96	128	60	15	192	122	60	15	192
06	WHA	135	60	12	504	128	60	12	1008	122	60	12	1008
06	WHA	135	64	12	36	128	64	12	72	122	64	12	72
06	WHA	135	64	12	36	128	64	12	72	122	64	12	72
07	Tungsten	130	52	20	36	120	52	20	72	135	52	20	72
07	Tungsten	130	52	20	36	120	52	20	72	135	52	20	72
07	Tungsten	130	55	20	198	120	55	20	396	138	55	20	396
07	Tungsten	130	50	20	234	120	50	20	468	138	50	20	468
07	Tungsten	130	60	20	18	120	60	20	36	135	60	20	36
07	Tungsten	130	60	20	18	120	60	20	36	135	60	20	36
08	Tungsten	130	60	20	18	130	60	20	36	145	60	20	36
08	Tungsten	130	60	20	18	130	60	20	36	145	60	20	36
08	Tungsten	130	55	20	18	130	55	20	36	145	55	20	36
08	Tungsten	130	55	20	18	130	55	20	36	145	55	20	36
08	Tungsten	130	50	20	216	130	50	20	432	145	50	20	432
08	Tungsten	130	50	20	216	130	50	20	432	145	50	20	432
09	Tungsten	160	55	20	18	154	55	20	36	165	55	20	36
09	Tungsten	160	55	20	18	154	55	20	36	165	55	20	36
09	Tungsten	160	50	20	252	154	50	20	504	165	50	20	504
09	Tungsten	160	47	20	252	154	47	20	504	165	47	20	504
09	Tungsten	160	55	20	18	154	55	20	36	165	55	20	36
09	Tungsten	160	55	20	18	154	55	20	36	165	55	20	36
18	Tungsten	100	60	15	1320	140	60	15	1320	115	60	15	2640
18	Tungsten	100	60	15	228	140	60	15	228	115	60	15	456
18	Tungsten	100	54	15	36	140	54	15	36	80	54	15	36
TOTAL					4932				8280				9828
Spare	Tungsten	140	60	15	174	129	60	15	690	0	0	0	0
	Tungsten	160	90	20	405	167	89	20	1611	0	0	0	0
TOTAL spares for W tiles					579				2301				0
Spare	WHA	0	0	0	0	180	105	12	432	0	0	0	0
	WHA (Chamfer tiles)	80	105	12	82	0	0	0	0	0	0	0	0
TOTAL spares for WHA tiles					82				432				0

Summary	Qty (Nos.)	
W	20160	
WHA	2880	
Spares for W	2880	
Spares for WHA	514	
Grand Total	26434	

Table 2: Total requirement of W / WHA Cladded / Coated Tiles for TFW project (For Lot-2)

		Toroidal Chamfer Tiles				Inner Flat Tiles				Outer Flat Tiles			
Row No.	Material	chamfer tile length [mm]	tile pol height [mm]	Tile Thickness [mm]	Qty tor chamfer tiles	inner tile length [mm]	tile pol height [mm]	Tile Thickness [mm]	Qty inner tiles	outer tile length [mm]	tile pol height [mm]	Tile Thickness [mm]	Qty outer tiles
01-02	W cladding over SS				0	105	60	12	3456	100	60	12	3456
05	W cladding over SS				0	105	60	12	1728	100	60	12	1728
10	W cladding over SS				0	120	60	12	1620	125	60	12	1620
10	W cladding over SS				0	120	75	12	54	125	75	12	54
10	W cladding over SS				0	120	75	12	54	125	75	12	54
11	W cladding over SS				0	100	60	12	1296	150	60	12	1296
11	W cladding over SS				0	100	60	12	896	150	60	12	896
11	W cladding over SS				0	100	78	12	160	150	78	12	160
12	W cladding over SS				0	115	84	12	1440	170	84	12	1440
13	W cladding over SS				0	125	82	12	960	120	82	12	1440
13	W cladding over SS				0	125	90	12	480	120	90	12	720
15	W cladding over SS	80	100	12	10	170	100	12	10	155	100	12	20
15	W cladding over SS	80	100	12	10	170	100	12	10	155	100	12	20
15	W cladding over SS	80	100	12	200	180	100	12	200	165	100	12	400
15	W cladding over SS	80	100	12	10	180	100	12	10	165	100	12	20
15	W cladding over SS	80	100	12	60	180	100	12	60	165	100	12	120
14	W cladding over SS	80	100	12	260	180	100	12	260	160	100	12	520
14	W cladding over SS	80	100	12	10	180	100	12	10	160	100	12	20
14	W cladding over SS	80	100	12	10	172	100	12	10	155	100	12	20
14	W cladding over SS	80	100	12	10	172	100	12	10	160	100	12	20
14	W cladding over SS				0	185	100	12	10	120	100	12	30
15	W cladding over SS				0	185	100	12	10	120	100	12	30
14	W cladding over SS				0	190	110	12	8	125	110	12	24
14	W cladding over SS				0	190	110	12	16	125	110	12	48
14	W cladding over SS				0	180	100	12	10	128	100	12	30
14	W cladding over SS				0	100	100	12	40	130	100	12	60
14	W cladding over SS	80	110	12	8	110	110	12	16	140	110	12	24
14	W cladding over SS	80	100	12	10	170	100	12	40	0	0	0	0
14	W cladding over SS				0	115	110	12	32	150	110	12	48
14	W cladding over SS				0	120	100	12	40	155	100	12	60
15	W cladding over SS	80	100	12	10	120	100	12	20	190	100	12	30
15	W cladding over SS	80	100	12	10	115	100	12	20	175	100	12	30
15	W cladding over SS	80	100	12	10	115	100	12	20	175	100	12	30
15	W cladding over SS				0	125	100	12	20	120	100	12	40
15	W cladding over SS				0	150	100	12	100	0	0	0	0
14	W cladding over SS				0	130	100	12	20	162	100	12	30
14	W cladding over SS				0	154	100	12	50	0	0	0	0
15	W cladding over SS	80	100	12	10	125	100	12	20	155	100	12	30
15	W cladding over SS	80	100	12	10	120	100	12	20	185	100	12	30
16	W cladding over SS				0	125	95	12	760	120	95	12	1140
16	W cladding over SS				0	125	100	12	80	120	100	12	120
16	W cladding over SS				0	125	100	12	480	120	100	12	720
16	W cladding over SS				0	125	95	12	120	120	95	12	180
17	W cladding over SS				0	125	100	12	1440	155	100	12	1440
TOTAL					648				16116				18198
Spare	W cladding over SS	0	0	0.00	0	0	0	0	0	0	0	0	0
TOTAL spares					0				0				0

Summary	Qty (Nos.)
W cladding over SS	34962
Spares	No Spares are envisaged for cladded tiles
Grand Total	34962