

<b>Program: [ 5.4 - RP5 – Laser plasma and high-energy-density physics ]</b>
<b>Subject: [ MOB Vacuum Chamber ]. Verification Control Document (VCD)</b>
<b>Specification: [ TC ID # 00261222/F - RSD_MOB Vacuum Chamber_TP20_066 ]</b>

**RSS TC ID # 020354/A.004;MOB Vacuum Chamber\_TP20\_066**

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					Yes / No		
<b>3. Operational Conditions</b>							
REQ-028873	A	All components shall work in the following operational conditions:Temperature (standard during operation): 21 °C. In the case of climate control system failure, the MOB-VC needs to remain safe at 21 ± 10 °C; Relative humidity: 40 – 80 %;Internal pressure: 10e-7 mbar;External pressure: 1 atm (1.01325 bar); ISO 7 cleanroom compatibility according to ČSN EN ISO 14644 (equivalent to ISO 14644) is mandatory for all surfaces outside of the vacuum surfaces. NOTE: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review, T - test				
<b>4. Design requirements</b>							
<b>4.1. General requirements</b>							
REQ-028874	A	The final design of the MOB-VC shall be developed by the Supplier using the ELI Beamlines conceptual design and 3D model as a starting point (see RD-01; section 1.4).	R - review				
REQ-028875	A	As part of the design finalization, the Supplier shall perform FEA analysis of the MOB-VC. NOTE: Load cases, which shall be MINIMALLY addressed are: FEA Stress analysis of Vacuum load FEA Stress analysis of Vacuum load and temperature control failure, i.e. thermal expansion and contraction caused by ±10°C temperature swing. FEA Stress analysis of Vacuum load and 5X 150kg loads on the top plate FEA Stress analysis during TMP crash or burst. (see REQ028919/A) FEA Modal analysis of MOB-VC FEA Modal analysis of MOB-VC FEA Modal analysis of Breadboard Assembly	R - review, A - analysis				
REQ-028876	A	All components exposed to vacuum shall be high vacuum (i.e. 10e7 mbar) compatible and shall be manufactured using materials and procedures that will guarantee low outgassing rate (including seal and weld integrity).	R - review				
REQ-028877	A	Precautions shall be taken to avoid trapped volumes in vacuum spaces which result in virtual leaks. These spaces shall be suitably vented. NOTE: This includes utilizing vented screws which are designed for ultra-high-vacuum and venting of volumes trapped by the O-rings.	R - review				
REQ-028878	A	The MOB-VC shall include pin holes for mounting alignment points which will be used for alignment and levelling of the MOB-VC. These alignment points shall be designed using the requirements outlined by RD-05. The positions of the alignment points shall be placed such that they are accessible when the MOB is fully assembled and spaced adequately to provide the leveling precision described in REQ-028885/A. The minimum number of points: Vacuum Chamber Main Body – 8; Vacuum Chamber Top Plate – 4; Breadboard Assembly – 4 / breadboard; Granite Foundations – 4 / part. NOTE: The alignment points shall be included on both the Vacuum Chamber and the breadboard assembly.	R - review, I - inspection				
REQ-028879	A	All conductive/metal parts shall have grounding points so that they can be protected against Electrostatic Discharge (ESD).	R - review, I - inspection				
REQ-028881	A	Screws shall be compatible with the material of the corresponding threaded hole.	R - review				
REQ-028882	A	All vacuum surfaces shall be finished according to general UHV guidelines and stainless steel parts will subsequently be electropolished (or similar) to a surface roughness Ra ≤ 0.8 µm.	R - review				

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REQ-028883	A	The outer (non-vacuum) surface finish of components shall comply with the requirements of cleanrooms of class 7 according to ČSN EN ISO 14644 (equivalent to ISO 14644). NOTE: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review, T - test				
REQ-028884	A	Outer surface finish of vacuum components (chambers, blank flanges, etc.) shall be blasted with uniform glass beads or have any other clean room ISO 7 compliant adequate surface finish with low optical reflectivity.	R - review, I - inspection				
REQ-028885	A	The design of the breadboard assembly and vacuum chamber shall provide a means to perform fine adjustment in order to level and align the MOB-VC. The precision for each assembly shall be: The Vacuum Chamber: less than ±1.0 mm along each axis; The Breadboard Assembly: Less than ±0.5 mm along each axis for each individual breadboard. NOTE: This can be obtained by properly adjusting and installing granite foundations with proper tolerances applied to the breadboard legs, breadboard connecting elements and the breadboard itself.	R - review, T - test				
REQ-028886	A	Tolerances of all parts shall be, at minimum, according to ČSN ISO 2768-mK (equivalent to ISO 2768-mK) (or equivalent). NOTE: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review				
REQ-028887	A	The maximum size of any part shall fit through the entrance door of the E3 hall sized: 3.1 (width) x 2.4 (height) meters.	R - review				
REQ-028888	A	The maximum lifting capacities of the ELI lift are: 12.5 tons when traveling downward 10.0 tons when traveling upwards Thus, the maximum weight of any single part shall be < 10 tons.	R - review				
REQ-028889	A	The MOB-VC shall accommodate the current connection to the L3 beam transport and ensure that there is free movement around the chamber. NOTE: Free movement means that the minimum pinch point within E3 as a result of the MOB-VC is 1.1m.	R - review, T - test				
<b>4.2. Vacuum Chamber</b>							
REQ-028890	A	The minimum inner dimensions of the vacuum chamber shall not be less than 3.6 (width) x 2.8 (depth) meters.	R - review, T - test				
REQ-028891	A	The Supplier shall adhere to the following standard with regards to the design of the vacuum chamber: "AD 2000 Regelwerk", EN 13445 or equivalent.	R - review, A - analysis				
REQ-028892	A	Deformation of all surfaces which are maintaining a vacuum seal shall not reduce the compression of the O-ring to < 10%. The maximum allowable sliding of sealing surfaces shall be limited to 10% of the nominal O-ring diameter. Otherwise, the maximum allowable deflection for any part of the vacuum chamber shall be < 3 mm.	R - review, T - test				
REQ-028893	A	The Supplier shall perform modal analysis of the vacuum chamber. Fundamental frequencies which shall be avoided include 50 Hz (±5 Hz), 100 Hz and 110 Hz.	R - review, A - analysis				
REQ-028894	A	The assembly shall be designed for operation at vacuum level pressure differential equal to 1 atm (e.g. approximately 10e-7 mbar vacuum level).	R - review, T - test				
REQ-028895	A	The measured single leak rate using He detector shall be less than 1.0E-9 mbar-l/sec. The single (local) vacuum leak test (He spray test) shall be performed according to ČSN EN 1779 (equivalent to EN 1779); method A.3, local test with high enough detection limit/resolution to verify that the single He leaks rates are ≤ 1 x 10-9 mbar-l/sec. Schematics for the test: NOTE: The CA consider the UHV type vacuum welds to have ≤ 1 x 10-11 mbar-l/sec leak rate.	T - test				
REQ-028896	A	The total leakage rate shall be less than 1.0E-6 mbar-l/sec.	T - test				

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REQ-028897	A	The materials used for the vacuum chamber manufacture shall be one or a combination of:EN 1.4307 (AISI 304L);EN 1.4404 (AISI 316L). NOTE: The use of other materials which provide the same level of vacuum compatibility and structural integrity can be used, but shall be approved with the CA.	R - review				
REQ-028898	A	O-ring groove designs shall be a dove-tail cross-section. The final groove geometry shall be approved by the CA. NOTE: If feasible, a feature shall be included which allows O-rings to be removed without being damaged.	R - review, I - inspection				
REQ-029692	A	O-ring seals shall be heat treated at 100 °C while exposed to ~1E-5 mbar vacuum to reduce outgassing to ≤ 4 x 10-9 mbar*l/s/cm² after ≤ 8 hours of pumping. NOTE 1: The O-rings are considered to meet the outgassing requirements and will be accepted if the measured RGA meets the following: • 43 AMU Peak amplitude shall be ≤ 1/10 of the 44 AMU peak • The amplitude of all peaks > 44 AMU peak shall be no higher 1/100 of the 44 AMU peak with 1.1% of the 44 AMU peak of isotope 13C in CO2 subtracted from the 45 AMU peak. • There are no significantly high AMU components above the background or instrument noise floor up to 200 AMU NOTE 2: The documented validation of the outgassing or all O-rings shall be part of the order. NOTE 3: The CA has the capability to RGA test the O-rings.	R - review, I - inspection				
REQ-028899	A	All vacuum sealing faces shall be designed to perform without the use of vacuum grease. One implication of this shall be the implementation of differential pumping. Differential pumping shall be used on all removable panels and doors as well as the Main Top Plate (see RD01 for details). The schematics of differential pumping with a double O-ring design and a relief groove is shown below:	R - review, I - inspection				
REQ-028900	A	The vacuum chamber will require users to do work from the top, thus, the Supplier shall include in the design features which provide the adequate level of safety for this type of work. (This is currently not included in RD01). NOTE: Examples of such safety features include:A railing around the edges (bolted not welded);Hook points for attaching a harness;Means to get on top of the chamber safely.	R - review, I - inspection				
REQ-028902	A	Lifting eyes shall be supplied to aid safe manipulation of the chambers removable panels.	R - review, I - inspection				
REQ-028903	A	The vacuum chamber shall include a large number of removable plates and doors to increase the modularity of the chamber. The number of panels/doors and their locations are documented in RD-01.	R - review, I - inspection				
REQ-029195	A	The vacuum chamber shall be designed to match the bolt hole pattern and orientation of existing equipment within the E3 hall. This information shall be provided to the supplier by the CA (see RD-01).	R - review, I - inspection				
REQ-029196	A	The vacuum chamber doors shall provide a means to maintain safety of workers while working inside the chamber, such as features for implementing a lock-out/tag-out system.	R - review, I - inspection				
REQ-029500	A	The vacuum chamber Top Plate shall have several M12 holes as specified within RD-01.	R - review, I - inspection				
<b>4.3. Breadboard Assembly</b>							
REQ-028904	A	The materials used for the breadboard assembly shall be optimized to meet the stability and cleanliness requirements of the chamber. NOTE 1: Recommended materials include:Aluminum (e.g. EN AW-5083, EN AW-6082 or EN AW-6061;Stainless Steel (e.g. EN 1.4307 (AISI 304L) or EN 1.4404 (AISI 316L)). NOTE 2: The use of other materials is possible, but must be agreed with CA. The CA shall agree on such other materials, if these show the same or better qualities for the intended purpose than the ones suggested above.	R - review				

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REQ-028905	A	The upper breadboard shall support up to 600 kg of optical equipment. This represents ~3x 200kg mirror mounts.	R - review, A - analysis				
REQ-028906	A	The lower breadboard shall support up to 2.0 tons of optical equipment. This represents ~10x 200kg mirror mounts.	R - review, A - analysis				
REQ-028907	A	The structure connecting the lower and upper breadboards shall be designed such that it provides the maximum amount of free space for optics and minimizes interference with laser beam paths. NOTE: Information anticipated optical layouts can be found in RD-01 drawings.	R - review				
REQ-028908	A	The breadboard assembly shall be designed to have fundamental frequency > 120 Hz best effort while loaded the optical masses described in REQ-028905/A and REQ-028906/A. If 120 Hz is not feasible, the measured fundamental frequencies shall not be any multiple of 50 Hz (±2 Hz) or 110 Hz (±2 Hz). The breadboard design shall be approved by the CA prior to commencement of manufacture. NOTE: For this analysis the upper breadboard shall be assumed to have 3x 200 kg mirror mounts and the lower breadboard shall be assumed to have 10x 200 kg mirror mounts. The mounts shall be equally spaced, they have a surface area 740mm x 300mm (w x d). The height of the COG for the mounts is 150mm.	R - review, A - analysis, T - test				
REQ-028909	A	Vibration decoupling bellows for vacuum sealing shall be utilized and shall be edge welded bellows.	R - review, I - inspection				
REQ-028910	A	The breadboards shall have M6 tapped holes with a depth 30 – 35 mm. Though not fully tapped, the holes shall be through-holes to reduce the effort required for cleaning.	R - review, I - inspection				
REQ-028911	A	The breadboard hole spacing shall be 50 mm on a Cartesian grid.	R - review				
REQ-028912	A	The breadboards tapped holes shall not be pressed but rather cut to allow the cleaning to a non-volatile residue (NVR) level of A/10, i.e. 0.1 µg/cm <sup>2</sup> .	R - review				
REQ-028913	A	Each breadboard mounting surface shall have a surface flatness of 0.1 mm / 1 m <sup>2</sup> or better for both the lower and upper breadboards.	R - review, T - test				
<b>4.4. Support Structure</b>							
REQ-028915	A	The support structure shall include granite foundations which the breadboard assembly shall be mounted to. NOTE: The vacuum chamber may be mounted directly to the granite or may have a separate steel structure which anchors directly into the concrete floor in the E3 hall. The floor of the E3 hall may not be drilled at any location due to the reinforcement bars and the water pressure of the ground below the floor. The CA shall provide scans of the E3 floor to ensure acceptable placements for all anchors.	R - review, I - inspection				
REQ-028917	A	The Supplier shall perform an analysis validating that the support structure design is capable to support all vacuum forces, thermal loads and bending moments. It shall maintain a FOS > 2.0. NOTE: Analysis should be completed assuming the vacuum chamber is connected to the other vacuum systems via and "un-bridged" (i.e. freely movable) bellows.	R - review, A - analysis				
REQ-028944	A	The fixation of the support structure shall be designed so that it can be performed using screws/anchors and cleanroom class 7 ultra-low-outgassing epoxy to the monolithic floor. NOTE: Non-class 7 certified epoxies may be utilized if approved by the CA beforehand.	R - review, I - inspection				
<b>4.5. Interfaces</b>							
REQ-028918	A	The Supplier will design interfaces for all of the connections given in the RD-01 (see section 1.4). NOTE 1: All interfaces shall be in accordance with the ISO 1609:1986 and ISO 2861:2013 standards (or equivalent). NOTE 2: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review				

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REQ-028919	A	Assessment of the safety aspects of the turbopump connections shall be performed by the Supplier (see section 1.4). There are two sizes of turbopumps which should be considered in this assessment. NOTE 1: 1x ISO320F TMP. Ex: Edwards STP-iXA3306C-ISO320F; Requirements from the manual state: Destructive Torque (kNm) = 71.2; 12x M12 Bolts; Bolt Material: Carbon-Alloyed Steel; Bolt Class: 12.9 or more. NOTE 2: 2x ISO250F TMP. Ex: Edwards STP-iXA3306C-ISO250F. Requirements from the manual state: Destructive Torque (kNm) = 48.1; 12x M10 Bolts; Bolt Material: Carbon-Alloyed Steel; Bolt Class 12.9 or more. NOTE 3: Further information about the turbopumps can be provided by the CA upon request.	R - review, A - analysis				
<b>5. Manufacturing Requirements</b>							
REQ-028920	A	All sealing O-rings used for the MOB-VC shall be made of FKM or FFKM materials or equivalent.	R - review, I - inspection				
REQ-028921	A	A material certificate according to ČSN EN 10204-2.2/3.1 (equivalent to EN 10204-2.2/3.10) shall be provided for all vacuum materials and parts. These certifications shall be made available to the CA. NOTE: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review				
REQ-028922	A	Any oxidation of vacuum surfaces, especially in the range of weld joints, shall be removed such that the cleanliness requirements are met (see section 5.1).	T - test, I - inspection				
REQ-028923	A	Sealing surfaces shall be free of scratches or dents.	I - inspection				
REQ-028924	A	The surface finish of all vacuum surfaces shall be better than Ra 0.8. The surface finish on all other surfaces shall be uniform. It is preferred that electro-polishing be utilized on stainless steel vacuum surfaces in order to achieve the required cleanliness levels. NOTE: Other finishing technologies which yield an acceptable level of cleanliness may be used if agreed with the CA.	R - review, I - inspection				
REQ-028925	A	Continuous vacuum sealing welds shall be completed on the vacuum side of the vessel. If tack/stabilizing welding is required, it may be used on the non-vacuum side of the chamber only.	R - review, I - inspection				
REQ-029694	A	The Supplier shall use the following tolerable welding procedures: inert-gas tungsten-arc welding (TIG), inert-gas metal-arc welding (MIG, MAG), plasma, electron beam, or laser welding.	R - review, I - inspection				
REQ-028928	A	The Supplier shall supply the CA with an extra set of O-rings for each custom O-ring.	I - inspection				
<b>5.1. Cleaning requirements</b>							
REQ-028929	A	The Supplier shall provide the CA with the description of the cleaning procedure for vacuum components which will be reviewed and requires approval from the CA.	R - review				
REQ-028930	A	All parts shall be cleaned to meet a particle cleanliness level of 130 guaranteed per MIL–STD-1246C (or equivalent standard) superseded by IEST-STD-CC1246E for particles with size > 5 µm. NOTE 1: The table below shows the particle cleanliness level 100. NOTE 2: The CA reserves the right to perform this test instead of the Supplier. In such a case the CA shall inform the Supplier at least 2 weeks in advance. The Supplier will still be responsible to meet the requirement based upon the test result. The procedure that would be used is described in RD-02.	R - review, T - test				

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REQ-028931	A	The total non-volatile residue (NVR) testing shall be performed for all parts of the MOB-VC. The NVR level shall be A/10 per MIL-STD1246C (or equivalent standard) superseded by IEST-STD-CC1246E, i.e. < 0.1 µg/cm2. NOTE 1: The table below shows the non-volatile residue cleanliness levels of the MIL-STD1246C. NOTE 2: The CA reserves the right to perform this test instead of the Supplier. In such a case the CA shall inform the Supplier at least 2 weeks in advance. The Supplier will still be responsible to meet the requirement based upon the test result. The procedure that would be used is described in RD-02	R - review, T - test				
REQ-029197	A	Where validating directly the NVR is not feasible, and when agreed by the CA, the Supplier may utilize instead a Residual Gas Analysis (RGA) Test. RGA tests for the MOB-VC shall meet the same requirements as the L3 beam transport vessel as described in Table 4 of RD-02 (see section 1.4). NOTE 1: Minimally the RGA meets the following requirementsThe amplitude of all peaks > 44 AMU are no higher than 1/100 of the 44 AMU peakThe peak at 43 AMU is < 1/10 of the 44 AMU peak with 1.1% of 44 AMU peak of isotope 13C in CO2 subtracted from 45 AMU peak.Check that there are no "significant" high AMU components above the background or instrument noise floor up to 200 AMU. NOTE 2: The CA reserves the right to perform this test instead of the Supplier. In such a case the CA shall inform the Supplier at least 2 weeks in advance. The Supplier will still be responsible to meet the requirement based upon the test result. The procedure that would be used is described in RD-02.	R - review, T - test				
REQ-028932	A	The Supplier shall provide procedures for the particle, the NVR, and RGA cleanliness levels verification to the CA. The CA shall approve of these procedures prior to test completion and acceptance. NOTE: See RD-02 and RD-03 for the CA's approved methods for clean procedures and procedures for verifying cleanliness.	R - review				
<b>5.2. Factory Acceptance Testing (FAT)</b>							
REQ-029995	A	The Supplier shall perform factory acceptance testing after cleaning and prior to delivery: Particle level testing (see REQ-028930/A);RGA testing (see REQ-029197 /A);Leak testing (see REQ-028895/A and REQ-028896/A).Dimensional check based upon RSD and RD-01 requirementsGeneral Over view based upon RSD and RD-01 requirements (e.g. ensuring all proper flanges and connections) NOTE 1: Procedures for all tests shall be approved by the CA, if all requirements stipulated in this RSD regarding the procedures are observed. NOTE 2: The Supplier shall allow the representatives of the CA (up to 6 persons, unless parties agree otherwise) to be present during the testing so that the necessary cooperation with the Supplier (if any is necessary) is secured.	R - review, T - test				
<b>6. Transportation requirements</b>							
<b>6.1. General requirements</b>							
REQ-028941	A	The Supplier will complete packaging and delivery in the presence of the CA.	R - review				
REQ-028933	A	The transportation to the final destination within E3 hall at the ELI Beamlines facility in Dolní Břežany of the MOB-VC shall be conducted by the Supplier.	I - inspection				
REQ-028934	A	The crates shall be labelled with the contents of the crate, i.e. with all part numbers of the contained components.	I - inspection				
REQ-028935	A	All parts of the MOB-VC shall be inspected after arrival at the CA facility to ensure no damage occurred during transport.	I - inspection				
<b>6.2. Packaging for transport – Ensuring Cleanliness</b>							
REQ-028937	A	Cleaned components/assemblies shall be double packaged in ULO foil and sealed.	R - review, I - inspection				

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REQ-028938	A	All cleaned components/assemblies shall be dry prior to packaging.	R - review, I - inspection				
REQ-028939	A	When possible, the cleaner shall ensure that part number and, if applicable, serial numbers on the Part Specific Label match with that of the components/assemblies in that bag. Such label shall be at the inner and outer packaging ULO foil.	R - review, I - inspection				
REQ-028940	A	The cleaned components/assemblies shall be fully covered by ULO and then sealed.	R - review, I - inspection				
REQ-028941	A	Assembly and packing of the MOB-VC shall take place under controlled conditions in a cleanroom class 7 environment or better according to ČSN EN ISO 14644 (equivalent to EN ISO 14644). NOTE 1: The ISO 14644 certification of the Supplier's cleanrooms is not required in lieu of an inspection by the CA. NOTE 2: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review, I - inspection				
<b>7. Installation Support</b>							
REQ-028941	A	The Supplier will review and provide input to the MOB installation procedures produced by the CA.	R - review				
REQ-028941	A	The Supplier will provide 1-2 individuals to assist in the installation of the MOB chamber.	R - review				
<b>8. Safety requirements</b>							
REQ-028947	A	The Supplier shall perform hazard identification and risk assessment of the MOB-VC as a part of the design process.	R - review, A - analysis				
REQ-028948	A	The Supplier shall be compliant with all regulations described in the Design Safety Engineering Standards/Guidelines (see RD-03 of reference documents).	R - review				
<b>9. Quality requirements</b>							
<b>9.1. General Quality Requirements</b>							
REQ-028950	A	The Supplier shall identify a Quality manager, which will be responsible for implementing and performing management and other Quality disciplines and functions to ensure fulfilment of all the requirements described in this RSD.	R - review				
REQ-028951	A	The Supplier shall define and document the responsibilities and the interfaces of the quality functions, either external or internal, involved in the contract.	R - review				
REQ-028952	A	The Supplier's personnel shall be certificated according to ČSN EN ISO 9712: 2013 (equivalent to EN ISO 9712:2012), Non-destructive testing - Qualification and certification of NDT personnel. NOTE: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review				
REQ-028954	A	The Supplier shall prepare, implement and maintain a quality plan which shall be approved by the CA. NOTE: The CA can assist with the quality plan definition.	R - review				
<b>9.2. Documentation and data control</b>							
REQ-028956	A	The Supplier shall provide the following relevant manufacturing documents: Full technical documentation (including final 3D model and manufacturing drawings, see REQ-028874/A, REQ-028960/A and REQ-028961/A); Breakdown list as-built or/and material list (see REQ-028897/A, REQ-028904/A, REQ-028920/A, REQ-028921/A); All approved "requests for deviation/wavier" (see REQ-028964/A).	I - inspection				

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REQ-028957	A	The Supplier shall provide to the CA the Product User Manual as part of the delivered MOB-VC. The Manual shall include the instructions and descriptions regarding the following procedures: transport, handling, storage; installation, alignment and cleaning; safe operation and maintenance procedures.	R - review				
REQ-028958	A	All tests shall be performed by the measuring instruments with the valid metrological confirmation. NOTE: The CA can request the Supplier to provide the valid Calibration Certificates.	R - review				
REQ-028959	A	All documentation shall be supplied in the English language.	R - review				
REQ-028960	A	The Supplier shall prepare and supply the detailed manufacturing drawings for the MOB-VC in *.pdf format and in one (two preferred) of the following file formats: *.dwg; Native dataDrawing files for Autodesk Inventor version 2020, Drawing files for Siemens NX.	R - review, I - inspection				
REQ-028961	A	The Supplier shall prepare and supply the updated 3D model of the MOB-VC in one (two preferred) of the following formats: Universal format: step *.STP; Native dataPart/Assembly files for Autodesk Inventor version 2020, Part/Assembly files for Siemens NX.	R - review, I - inspection				
REQ-028963	A	The MOB-VC shall be marked on the outside with the following information: Manufacturer; Date of manufacture; Manufacturer reference (e.g. serial number).	I - inspection				
<b>10. Verification requirements for the Supplier</b>							
<b>10.1. General requirements</b>							
REQ-028967	A	The Supplier shall assign clear responsibility for the implementation of the verification process including all activities defined in REQ-028966/A.	R - review				
<b>10.3. Verification planning and reporting</b>							
REQ-028971	A	The Supplier shall provide a Verification Control Document (VCD) in coordination with and having approval from the CA. NOTE 1: Guidelines for VCD preparation will be provided by the CA (see RD-04; section 1.4). NOTE 2: The form of VCD will be agreed between the CA and the Supplier based on the best commercial praxis used by the Supplier.	R - review				
REQ-028973	A	The verification approach shall be defined by the Supplier in the VCD prior to its implementation.	R - review				
REQ-028974	A	In the VCD, the Supplier shall describe HOW and WHEN each of the technical requirements is to be verified. NOTE: Since some requirements are to be verified through a review of design the VCD shall be prepared by the Supplier and agreed with the CA before starting of the Design Review.	R - review				
REQ-028975	A	The Supplier will provide regular progress reports to the CA in the form of the VCD execution and, if required by the CA, a PowerPoint presentation. The frequency for these shall be no less than 1 per month.	R - review				
<b>10.4. Verification execution</b>							
REQ-028978	A	The results of the analysis shall be documented by the corresponding Analysis Report (A-R) and tracked in the VCD (see section 10.3).	R - review				
REQ-028979	A	The results of a review of design shall be documented in the Critical Design Review Report (CDR-R) and tracked in the VCD (see section 10.3). NOTE: The CA can provide to the Supplier the template of the CDR-R.	R - review				
REQ-028980	A	Any dimensional or design modifications that may arise after the CDR shall be consulted with and approved by the CA.	R - review				



<b>Program: [ 5.4 - RP5 – Laser plasma and high-energy-density physics ]</b>
<b>Subject: [ MOB Vacuum Chamber ]. Verification Control Document (VCD)</b>
<b>Specification: [ TC ID # 00261222/F - RSD_MOB Vacuum Chamber_TP20_066 ]</b>

<i>RSS TC ID # 020354/A.004;MOB Vacuum Chamber_TP20_066</i>							
Requirement TC ID	Rev.	Requirement text	Verification Method (VM)	Deliverable (when)	Close-out	Verification Record Document (ID # of report/ protocol and page #)	Comments
					Yes / No		
REQ-028981	A	The final manufacturing drawings and the parts of the VCD related to the Design of the MOB-VC shall be accepted by the CA before the commencement of manufacturing.	R - review				
REQ-028982	A	The results of the inspection shall be tracked in the VCD.	R - review				
REQ-028983	A	The results of the test shall be documented in the appropriate Test Report (T-R) and tracked in the VCD (see section 10.3).	R - review				
REQ-028984	A	The Supplier shall perform the verification leak testing of the MOB-VC in the presence of the CA representative. NOTE 1:Single leak test (spray test) shall be performed according to ČSN EN 1779, method A.3 (equivalent to EN 1779). NOTE 2:Total leak test shall be according to ČSN EN 1779, method D.2 (equivalent to EN 1779). If this is not possible due to the size of the chamber, other methods may be proposed by the Supplier. NOTE 3: Regarding the referred to standard/s the CA allows/permits also another equal solution to be offered.	R - review				
REQ-028985	A	The Supplier shall provide reports with results of vacuum and cleanliness test of the MOB-VC.	R - review				
REQ-028986	A	With the support of the CA, the Supplier shall carry out the final verification of requirements according to the VCD and record the results in the final VCD issue (see section 10.5).	R - review				