

Procurement Guide

for the European open tender for a closed-cycle cryogen-free cryostat

Contracting Authority:

The Netherlands Organisation for Applied Scientific Research (TNO)

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Definitions

In this Procurement Guide, words written with an initial capital, both singular and plural, shall have the following meanings. Terms not mentioned in this list but defined in the Dutch Public Procurement Act [*Aanbestedingswet*] have the meaning assigned to them in the Procurement Act.

Contracting Authority	: TNO, Netherlands Organisation for applied scientific research
Procurement Guide	: the present document describing the Procurement Procedure.
Procurement Procedure	: the present European public Procurement Procedure by which the conclusion of the Contract is tendered.
Dutch Public Procurement Act	: Dutch Public Procurement Act 2012 (hereinafter: "Procurement Act" or "Aw") concerning the implementation of procurement directives 2014/23/EU, 2014/24/EU and 2014/25/EU
Procurement Documents	: all documents prepared by or on behalf of TNO for the purpose of the Procurement Procedure.
Announcement	: the Notice of Procurement Procedure at www.TenderNed.nl .
Annex(es)	: The Annexes to the Procurement Guide, namely: • A01 to A05 i.e. the formats to be used by the Tenderer in preparing and submitting its Tender, • B01 to B03 - i.e. the formats to be used by the intended beneficiary for the purpose of submitting supporting documents relating to the ESPD at the request of TNO, • C01 to C03 - i.e. documents and (additional) information, which form part of the Procurement Guide and are not intended for submission by the Tenderer or the intended beneficiary.
Combination	: an alliance of enterprises tendering jointly as a single Tenderer, each of the Combination members being jointly and severally liable for the performance of the Contract.
Third Party	: natural persons on whom, or legal entities on which, a Tenderer may rely in order to meet the Suitability Requirements of financial and economic standing and/or technical and professional competence, irrespective of the legal nature of its links with said Third Party.
Suitability Requirements	: the requirements imposed by TNO on Tenderers not excluded on the basis of the Grounds for Exclusion, which Tenderers must meet as a minimum in order to be eligible for the award of the Contract, on penalty of invalidation, as described in Section 5.
Award criterion	: the criterion used by TNO in the assessment and ranking of Tenders for the purpose of awarding the Contract, as referred to in Section 6.
Award decision	: the written communication of TNO's choice of the Tenderer with which it intends to conclude the Contract or its choice not to conclude a Contract.
Tenderer	: an entrepreneur submitting a Tender.
Tender	: an offer/quotation made by a Tenderer.
Minimum Requirements	: the requirements set by TNO regarding the manner in which the Contractor must perform the Contract.
Information Notice	: the document containing further information about the Procurement Procedure and/or the Procurement Documents and in which TNO presents and answers the Tenderers' questions in anonymised form.
Contractor	: the Tenderer with which the Contract is concluded.

Contract	: the Contract concluded with the Contractor pursuant to the outcome of the Procurement Procedure. The Contract is concluded after it has been signed by TNO and the Contractor.
Grounds for Exclusion	: grounds for exclusion from participation in the Procurement Procedure, which – depending on the provisions of the Procurement Documents – relate to circumstances concerning the (person of the) Tenderer, the (person of the) Third Party and/or the (person of the) Subcontractor.
European Single Procurement Document	: the declaration as referred to in Article 2.84(1) of the Procurement Act, which TNO has attached to the Procurement Guide as Annex A01 (hereinafter: ESPD).

1 Contracting Authority and Contract

1.1 TNO

TNO, Netherlands Organisation for applied scientific research, hereinafter referred to as "TNO", is a modern unit-driven Research & Knowledge organisation, established by law in 1932 to make scientific research applicable to enterprises, government bodies and civil-society organisations and thereby strengthen innovative capacity.

TNO is a public-law legal entity and operates under the ministerial responsibility of the Dutch Minister of Economic Affairs but, as an organisation, performs its tasks independently.

Every day, TNO's employees are working on the development and application of innovative research. TNO provides contract research and specialist consultancy and licenses patents and specialist software. TNO starts up new enterprises to bring innovations to market.

TNO's strength lies in its ability to combine diverse fields of science to create ground-breaking, sustainable solutions. Increasingly, TNO does so by collaborating with government bodies, industry, other knowledge institutions and civil-society organisations, both nationally and internationally. Through its work, TNO stimulates economic growth and social innovation.

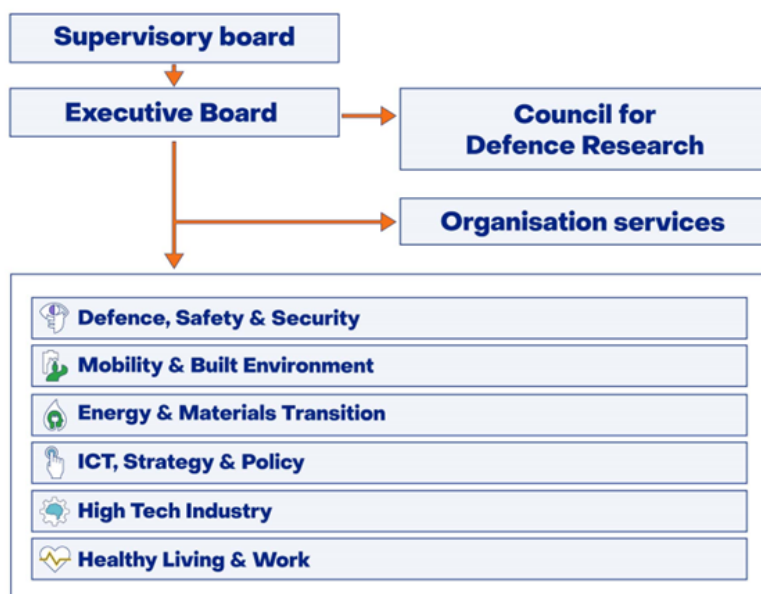
TNO's mission is creating impactful innovations for the sustainable wellbeing and prosperity of society. How TNO fulfils this mission is described in its strategic plan for 2022-2025 and focuses on four societal challenges: a safe and secure society, a sustainable society, a healthy society and the digitalisation of society and industry.

TNO's goal is to connect, change and accelerate: Innovation for Life

For more information on TNO, see: www.TNO.nl.

1.2 The TNO organisation

With TNO's highly ambitious approach comes an organisational form that effectively facilitates this ambition and a culture that challenges employees to innovate and collaborate. The TNO organisation has a unit structure as shown below:



The six organisational units (Units) are market-oriented and recognisable to TNO's customers and partners.

The Units are based across the Netherlands with a total of 21 locations/research facilities.

The head office is located in The Hague and accommodates the central staff bodies (Shared Services Organisation) and from where the entire TNO organisation is supported and managed.

Procurement department

The Procurement department is effecting the procurement on behalf of TNO in close cooperation with the Quantum technology department.

Procurement, as part of the Finance, Procurement & Legal (FPL) department, is responsible for organising and executing procurement processes and ensuring that these processes are in line with the TNO objectives.

1.3 Purpose of the Tender

The purpose of the Tender is TNO's intention to enter into a Contract with one (1) Contractor for the delivery of closed-cycle cryogen-free cryostat. This supply/service shall be performed in accordance with the requirements and preferences as set out in the Procurement Documents.

1.4 Current situation, vision of future situation

In the current situation, TNO has several cryostat systems in the form of the Quantum Information Technology Testing (QITT) facility. The QITT facility is being used by external clients to test their applications and the QITT facility is being used by internal TNO projects. At the moment, the QITT facilities are overbooked. TNO has the vision to increase the capacity of cryostat systems in the QITT facilities to handle the overbooking.

1.5 Objective, scope and content of the proposed Contract

The Contract "European open tender for a closed-cycle cryogen-free cryostat" to be entered into provides for the supply of products and the provision of services, as specified in detail in the Programme of Requirements and Preferences (Sections 8 and ...).

Following the present Procurement Procedure, TNO intends to award a contract for the purchase of a dilution refrigerator in accordance with the Procurement Guide.

In general terms, the contract involves:

- The closed-cycle cryogen-free cryostat system;
- Two year warranty
- (Critical) Design review
- Site Acceptance Tests (SAT)
- Installation on site
- Operator & (basic) maintenance training
- Delivery according Incoterm 'Delivered Duty Paid' (DDP, 2020. Location TNO Delft (further specified on PO)

1.6 Maintenance/services Contract

System downtime can lead to loss of opportunities and possibly revenue. Therefore, in relation with this Tender procedure, TNO might intend to enter into a contract for maintenance/services for a period of one year up to a maximum of five years. In this light, TNO expects to receive a proposal or proposals that minimise such system interruptions.

TNO has divided maintenance/services into two types, being 'basic' and 'all-inclusive'. The price for the various options for maintenance/services must be submitted by the Tenderer in Annex **A03**. These quoted prices shall be fixed, and no indexation should take place the first 2 years after the final acceptance of the cryostat by TNO.

For the elaboration of what exactly falls under the maintenance (for the relevant price, as offered in the price sheet), TNO expects an elaboration to be submitted as 'Annex **A05** - Maintenance/Services' (own format).

What is offered for the 'basic' or 'all-inclusive' maintenance contract type?

What exactly does Tenderer offer and how does this match with the preferences of TNO, such as but not limited to response times, service-desk reachability, software updates, additional service hours which are not covered in this type of contract etc?

Make a preventive and (if available) a corrective breakdown here. The maintenance time of the cryostat shall not exceed two weeks per year. Therefore, state the consequences of not achieving or not fulfilling the service level specified by the tenderer.

The intention to enter into a maintenance contract depends on the price and whether it falls within the total available budget. For this reason, and to allow a fair price comparison, TNO will only include the price for a one-year basic maintenance contract multiplied by five (5) years in the price assessment (para. 6.1). It should be clear to TNO what is covered by the maintenance contract, but also what is not covered by the contract, and this will result in an additional cost to TNO.

If you typically provide different types of maintenance contracts, you can present these variations alongside the basic maintenance contract. However, please be aware that only the basic maintenance contract and its price will be assessed. The price for all potential variations in maintenance services, covering a period of one year up to and including 2030, considering the closed-cycle refrigerator cryostat system, will only be available by 2025 (a total of (5 years)). Tenderers can submit this information in Annex A03.

1.7 Optional second closed-cycle refrigerator cryostat system

TNO might have the intention to buy a second closed-cycle cryogen -free cryostat system with the same similar requirements/preferences (chapter 8), and this within a period of maximum three years after final award decision and the signing of the Contract. Such a purchase will take place under the same tender conditions. For this reason, Tenderer is asked to fill-in the related line numbers in Annex A03.

2 Procurement Procedure

The procurement procedure is carried out in accordance with the relevant regulations stipulated under the Aw. TNO has opted for the public procedure. This tender has been published on and will proceed through TenderNed, www.TenderNed.nl.

2.1 Schedule for the Procurement Procedure

The proposed schedule for the Procurement Procedure is as follows:

No.	Action points	Date
1.	Publication of Announcement of Contract (at www.TenderNed.nl)	02-04-2025
2.	Closing date for submission of questions by Tenderers	25-april-2025 15:CET
3.	Issue of (final) Information Notice	09 may 2025
4.	Closing date and time for submission of Tenders	23 may 2025 15:00 CET
5.	Notification of Award Decision	06 June 2025
6.	Closing date for submission of supporting documents by intended beneficiary	13 Juni 2025
7.	Closing date for submission of challenges	26 juni 2025
8.	Final award	27 juni 2025

The dates are indicative. TNO reserves the right to change the dates, subject of course to the minimum periods as laid down in the Dutch Public Procurement Act [*Aanbestedingswet*]. Affected enterprises will be notified of any change in the schedule via TenderNed.

2.2 Tender conditions

As part of the Procurement Procedure, TNO applies the following conditions.

2.2.1 Agreement

Submission of the Tender implies that the Tenderer agrees to the terms and conditions of the Procurement Procedure and agrees to the contents of the Tender Documents, including any unwelcome answers in the Information Notice.

2.2.2 Formats

The Tenderer should use the formats as included in the Annexes to this Procurement Guide. It is expressly not permitted to make changes to these formats, unless TNO has expressly stated otherwise.

2.2.3 European Single Procurement Document (ESPD)

The Tenderer must submit an ESPD as specified in the instructions given below. The Tenderer must use the ESPD as appended in Annex A01.

To access and complete the ESPD electronically, the Tenderer must only use the Adobe Reader software program, preferably the latest version. Opening the ESPD in a program other than Adobe Reader may result in the ESPD appearing different from the version pre-filled by TNO and/or showing errors. Submission of an ESPD that differs from the version as provided by TNO with the Procurement Documents will render the Tender invalid, unless TNO considers this disproportionate in a specific case. The responsibility for opening the ESPD in the prescribed manner and submitting the correct version thereof rests with the Tenderer.

For legally valid signature of the ESPD, see Section 2.2.20 of this Procurement Guide.

2.2.4 Precedence of Procurement Documents

In the event of discrepancies between the contents of the various Procurement Documents, the following order of precedence applies during the Procurement Procedure, in descending order of prevalence:

- Information Notice(s): from most recent to least recent;
- Procurement Guide with Annexes:
 - o Programme of Requirements and Preferences (Annex A04)
 - o The Price Sheet (Annex A03)
- Announcement.

2.2.5 Contact person and communication

All communication relating to the Procurement Procedure, with the exception of Section 2.3 "Further Information (questions)", will take place via TenderNed only and in the manner specified in this Procurement Guide.

If direct contact with TNO is specified/necessary, communication will take place exclusively with the TNO contact person stated below, in writing at all times, via the TenderNed messaging module.

Name : Jelle van der Kooi
Position : Procurement Advisor
Department : Procurement
Postal address : PO Box 96800, NL-2509 JE The Hague

Tenderers cannot derive any rights from oral statements, undertakings and suggestions made by TNO employees and/or consultants in relation to the Procurement Procedure and/or the Procurement Documents. Tenderers may only rely on information provided in writing by or on behalf of TNO.

On penalty of exclusion, enterprises may not contact persons other than the contact person with regard to the Tender, unless TNO considers this disproportionate in a specific case. Nor is it permitted, on penalty of exclusion, to communicate with the contact person in any way other than via TenderNed, unless TNO considers this disproportionate in a specific case.

An instruction regarding digital procurement via TenderNed can be found by selected bidders in TenderNed's support environment (<https://www.TenderNed.nl/cms/help>). If you have any questions or are unclear about the operation of TenderNed (for example, if you are unable to log in or submit documents) or if TenderNed malfunctions, the TenderNed service desk can be contacted from 8.30 a.m. to 4.30 p.m. on working days on 0800 - 836 33 76 or via servicedesk@TenderNed.nl.

2.2.6 Language

Tenders must be written in the English language. Tenders in languages other than English will be excluded from participation. Official documents that cannot be submitted in the English language may be written in the language of the document's country of origin. Upon request, the Tenderer shall arrange a translation by a sworn interpreter-translator. The costs incurred shall be borne by the Tenderer.

2.2.7 Single Tender

An enterprise may only be involved in one (1) Tender: either as an independent Tenderer, a member of a Combination, or a subcontractor or Third Party. With regard to enterprises belonging to the same group as referred to in Sections 2:24b and 2:24c of the Dutch Civil Code, more than one company from the group may submit a Tender, provided that the enterprises demonstrate, at TNO's request, that the Tenders have been drawn up independently and autonomously.

Where this cannot be demonstrated by all the Tenderers concerned, all the Tenders emanating from enterprises belonging to the same group will be excluded.

2.2.8 Combination

A Combination of enterprises may submit a Tender jointly as a single Tenderer.

To do so, the following conditions must be met.

- All members of the Combination shall submit their own completed and validly signed ESPD. This states that registration takes place in Combination and, if selected, registered.
- The ESPD specifies which member of the Combination will fulfil the role of coordinator. The coordinator is the only member with which TNO corresponds regarding the Procurement Procedure and, where applicable, the Contract. The coordinator must have the power to legally bind all members of the Combination in respect of the Procurement Procedure and, where applicable, (the award of) the Contract.
- All members of the Combination must individually declare in their own ESPD whether they are subject to Grounds for Exclusion (see Section 5.1). The members of the Combination will each be assessed individually against the Grounds for Exclusion. If one or more Exclusion Grounds apply to one or more members, the entire Combination will be excluded.
- The Combination as a whole will be assessed against the Suitability Requirements, subject to any exceptions referred to in Section 5.2. In the ESPD, the Combination members declare how the Combination meets the Suitability Requirements. If the Combination as a whole does not meet all Suitability Requirements, the submission of the Combination will be laid aside.

By submitting the Tender, the Combination members declare that all the participants in the Combination are jointly and severally liable for the fulfilment of the obligations arising from the Procurement Procedure, as well as from any performance of the Contract. By submitting the Tender, the Combination members declare that the coordinator is authorised to validly represent the Combination and the individual Combination members in all matters relating to the Tender and, in the event of the award of the Contract, the Contract.

2.2.9 Subcontracting

A Tenderer may use one or more subcontractors to carry out the work. A cooperative venture in the form of a main contractor and subcontractors may tender as single Tenderer. The main contractor shall remain at all times responsible and liable for all work, including any work performed by a subcontractor.

TNO recognises the following subcontractors:

Reliance on subcontractor to meet Suitability Requirements

Where the Tenderer relies on the financial and economic standing and/or technical and professional competence of a subcontractor to meet the Suitability Requirements, said subcontractor shall also be deemed a Third Party. In this case, the Tenderer must follow the instructions as described in Section 2.2.10 concerning reliance on the resources of a Third Party or Parties. All Third Parties must be listed in Section IIC of the ESPD (Annex **A01**).

Deployment of subcontractor to perform the contract

Where a Tenderer meets the specified Suitability Requirements independently but wishes to use one or more subcontractors to carry out the work, the Tenderer need not disclose the identity of the subcontractor(s) in the Tender. While the Tenderer must tick the box in its ESPD, Part IID, to indicate that it intends to use subcontractors, their names need not be disclosed at this time. However, the Tenderer must do so not later than seven (7) calendar days after the provisional award, as TNO has to pre-approve the subcontractors to be used. If the Contractor wishes to replace a subcontractor during performance of the Contract, this will only be possible subject to TNO's prior consent in writing.

If a Tenderer wishes to use a subcontractor, a completed ESPD (Annex **A01**; parts IIA, IIB and III) must be submitted not later than seven (7) calendar days after the provisional approval of said subcontractor, as well as the supporting documents relating to the Grounds for Exclusion (Section 5). Where a subcontractor is subject to one or more Grounds for Exclusion and said subcontractor has not given convincing reasons in the ESPD why it should nevertheless not be excluded (see Section 5), the subcontractor will not be approved. Otherwise, approval of a subcontractor will not be unreasonably withheld.

If a Tenderer intends to use multiple subcontractors, a completed and duly signed ESPD (Annex **A01**) must be submitted from each subcontractor. The subcontractor has only to complete parts IIA, IIB and III of the ESPD. These ESPDs will be appended to the Tender.

The subcontractor's ESPD (Annex **A01**) must be duly signed. For signing authority, please refer to Section 2.2.20.

If the Tenderer does not intend to use subcontractors

The Tenderer should indicate its intention not to use subcontractor(s) by ticking only the "no" box in Part II D of the ESPD (Annex **A01**).

2.2.10 Reliance on Third Party resources?

The Tenderer may rely on the financial and economic standing and/or technical and professional competence of a Third Party or Parties.

If the Tenderer relies on the financial and economic capacity of a Third Party or Parties, both the Tenderer and the Third Party or Parties on whose financial and economic capacity the Tenderer relies will be jointly and severally liable for the obligations arising from the Procurement Procedure and for the obligations arising from the performance of the Contract, if awarded to the relevant Tenderer.

If the Tenderer relies on the technical and professional competence of a Third Party or Parties, said Third Party or Parties should also be involved in the performance of the Contract, if awarded to the relevant Tenderer.

No reliance on Third Party resources

If the Tenderer does not rely on the financial and economic standing and/or technical and professional competence of a Third Party or Parties, it should complete Part II C of the ESPD (Annex **A01**) to indicate that it does not rely on the financial and economic standing and/or technical and professional competence of a Third Party or Parties, by ticking the "no" box.

Reliance on Third Party resources

A) Requirements for submitting a Tender

If the Tenderer does rely on the financial and economic standing and/or technical and professional competence of a Third Party or Parties, the Tenderer should complete Part II C of the ESPD (Annex **A01**) to indicate:

1. that it is relying on the financial and economic standing and/or technical and professional competence of a Third Party or Parties, by ticking the "yes" box
2. the Suitability Requirements for which it relies on the Third Party or Parties and,
3. for each stated Suitability Requirement for which it relies on a Third Party or Parties, and the Third Party or Parties it relies on for that purpose.

In addition, if the Tenderer relies on the financial and economic standing and/or technical and professional competence of a Third Party or Parties, it shall submit the following:

4. a separately completed and duly signed ESPD (Annex **A01**) from each Third Party on whose financial and economic standing and/or technical and professional competence it relies, in which the Third Party completes Parts II A, II B and III in respect of the Third Party itself. The ESPDs of the Third Party or Parties must be duly signed as referred to in Section 2.2.20.

Additional requirement for submitting a Tender in the event of reliance on technical and professional competence of a Third Party or Parties

5. If and insofar as the Tenderer relies on the technical and professional competence of a Third Party or Parties, the Tenderer must submit a list of reference projects completed by the Third Party or Parties on whose technical and professional competence the Tenderer relies, in addition to any list of its own reference projects to be submitted by itself with its Tender. If and insofar as the Tenderer submits reference projects of a Third Party or Parties, it must also use the format for reference projects (Annex **A03**) for this purpose.

B) Requirements for intended beneficiary relying on a Third Party or Parties

The Tenderer to which TNO intends to award the Contract on the basis of the Award Decision and which relies on the financial and economic standing and/or technical and professional competence of a Third Party or Parties must submit at TNO's request within the period specified in Section 7.1 of the Procurement Guide:

1. a declaration by said Third Party or Parties stating that the Tenderer can actually access the resources of the Third Party or Parties relied upon. If the Tenderer relies on the financial and economic standing of a Third Party, it shall submit a declaration in the format provided in Annex **B01**. If the Tenderer relies on the technical and professional competence of a Third Party, it shall submit a declaration in the format provided in Annex **B02**;
2. any evidence as referred to in Section 5.1, which allows the Third Party or Parties whose suitability the Tenderer relies on to demonstrate that the Grounds for Exclusion do not apply to the Third Party.

Additional requirement for intended beneficiary in the event of reliance on financial and economic standing of a Third Party or Parties

3. The Tenderer to which TNO intends to award the Contract on the basis of the Award Decision and which relies on the financial and economic standing of a Third Party or Parties must, at TNO's request, submit within the period specified in Section 7.1 of the Procurement Guide, in addition to the documents referred to above under B) (regarding "*Requirements for the Intended Beneficiary*"): the documents that will be substituted for those that the Tenderer must submit to prove that it meets the Suitability Requirements regarding financial and economic standing.

2.2.11 Variants

Offering variants and/or alternative Tenders is not permitted and they will therefore be disregarded.

2.2.12 "Or equivalent"

The technical specifications are formulated as much as possible on the basis of EU and other standards, performance requirements and functional requirements. Where the Procurement Documents, including the Annexes, nevertheless refer to brand names, patents, types, manufacturing processes, etc., the Tenderer should read "or equivalent" after the relevant phrase.

Tenderers are free to provide an equivalent product, service or type of work. If they do so, the Tenderers must justify in or with their Tender why they are offering an equivalent product, service or type of work. It is up to TNO to assess whether the latter are actually equivalent. TNO reserves the right to have their equivalence assessed by a third party if necessary.

2.2.13 Rights reserved by TNO

1. TNO reserves the right to stop the entire Procurement Procedure temporarily or permanently. If TNO decides to discontinue the Procurement Procedure, legal protection is guaranteed in accordance with paragraph 2.4 of the Procurement Guide.
2. TNO reserves the right at all times to subject the data and statements provided by Tenderers to further investigation and verify their accuracy (or have them verified), as well as to approach any references provided, without prior notification thereof to Tenderer. The results thereof will be considered in the assessment of the Tender.

The Tenderer is aware that if at a later stage it is found that incorrect and/or incomplete information has been provided and/or that requirements set out in the Procurement Documents are not or no longer being met, the Tenderer will be excluded from further participation in the Procurement Procedure or agreements already made may be cancelled and contracts dissolved. In such cases, TNO cannot be held liable for the consequences thereof for the relevant Tenderer and TNO will not be obliged to reimburse any costs and/or any loss or damage of any kind.

2.2.14 Confidentiality

The Tenderer will observe strict confidentiality in respect of all information that is or becomes known to it through TNO. It will not make the information available to Third Parties and will only disclose it to its staff, including consultants, subcontractors and Third Parties, insofar as this is necessary for the submission of the Tender or – if and insofar as applicable – the performance of the Contract.

TNO acknowledges the confidentiality of the Tenderer's Tender and will not disclose to Third Parties any information known to it from this source. It will be necessary to disclose information from the Tender, where appropriate, in the context of justifying the Award Decision. The Tenderer recognises this and agrees accordingly.

2.2.15 Distortion of competition

Distortion of competition will result in exclusion. If TNO suspects that distortion of competition has occurred, it will give the relevant Tenderer(s) the opportunity to demonstrate that it has not been guilty of distorting competition. If TNO deems that the Tenderer has failed to do so, the Tenderer will be excluded from further participation in the Procurement Procedure.

2.2.16 Withdrawal by Tenderer

Any Tenderer who has submitted a Tender may withdraw it until the closing date for tenders. After that moment, the period of validity starts. The Tender is irrevocable during the period of validity.

2.2.17 Period of validity

The Tenderer upholds its hundred twenty (120) calendar days from the closing date for submission of the Tender (Section 2.1). The period of validity is automatically extended until the final conclusion of the Contract with the first-ranked Tenderer.

If summary proceedings are instituted against the Award Decision, the period of validity will be automatically extended by a period of thirty (30) calendar days from the date of the decision of the preliminary relief judge.

TNO may request Tenderers to extend the period of validity. Tenderers cannot derive from this any right to be awarded the Contract.

2.2.18 Contract terms

The Contract will be awarded in accordance with:

- Contract WS2436525424, the draft version of which is included in Annex C02;
- *Conditions of Purchase for Goods*, February 2022, as included in Annex C03, except insofar as they are explicitly departed from in the Procurement Documents and Framework Agreement.

In accordance with Section 2.3 of this Procurement Guide, Tenderers may submit text and amendment proposals for this Contract and the General Purchasing Conditions. The final Information Notice will respond to these proposals or add the final Contract and General Purchasing Conditions.

The general terms and conditions (including terms of supply) or terms and conditions of Third Parties (including subcontractors and auxiliary persons) used by the Tenderers, both during this Procurement Procedure and also, in the event of award, during the performance of the final Contract and any contracts to be concluded under its terms, are expressly rejected by TNO. If they declare their own terms and conditions applicable, this will render their Tender invalid.

In the final Information Notice, TNO will indicate where final changes have been made.

Acceptance of these amendments to the Framework Agreement/Acceptance of the Final Contract and General Purchasing Conditions is a minimum requirement. Failure to comply with these conditions will result in the Tenderer's exclusion from further participation in the procedure.

2.2.19 Conditional Tender

TNO will exclude conditional Tenders from further participation in the Procurement Procedure.

2.2.20 Legally valid signature

The Tender must be validly signed. "Validly signed" means that the ESPD has been signed by the duly authorised representative(s) of the Tenderer as stated in TenderNed. A validly signed ESPD means that the Tender as a whole has been validly signed, unless a separate valid signature is required for one or more documents. TNO would point out that the trade register may state that two or more persons are joint authorised representatives, or that a representative is authorised only up to a certain monetary value. This has implications for the authority to sign and Tenderers should anticipate this. The authority to sign should be evidenced by an extract from the trade register. It is also possible for the Tender to be signed by a proxy. In this case, a power of attorney must be issued by a legally authorised representative of the Tenderer, as evidenced by the trade register, or the power of attorney must be recorded in the trade register.

The extract or the power of attorney need only be issued to TNO if a request to that effect has been made by TNO, as specified in the requirements set out in Section 7.1 of the Procurement Guide.

A Tender not validly signed shall be deemed not to have been made and shall be invalid.

This provision also applies to the ESPD submitted by members of a Combination and/or for the Third Party or Parties on whose standing/experience/resources the Tenderer relies. In their case too, only the ESPD need be validly signed and this signature will also serve as a valid signature for other documents completed and submitted by them.

Electronic signature

Signature in the form of an electronic signature is also permitted. The following requirements apply in this regard: an E-recognition tool ("eHerkenning" in Dutch) with at least security level 4 (EH4) must be used.

2.2.21 Reimbursement of expenses incurred in submitting the Tender

Any expenses incurred by Tenderers in preparing and submitting the Tender will not be reimbursed.

2.2.22 Statement of prices and expenses

Prices and costs must be stated in euros excluding VAT and will be fixed for the term of the Contract unless otherwise specified. TNO hereby explicitly states that no price negotiations will be entered into as part of this Procurement Procedure.

2.2.23 Publicity

No publicity will be given to the Procurement Procedure by the Tenderer or by partners and/or subcontractors to be engaged by the Tenderer except with TNO's consent in writing. All information on the Tender will be treated confidentially by Tenderer and the parties to be engaged by them.

2.2.24 Intellectual property

Subject to exceptions as specified in the Dutch Copyright Act [*Auteurswet*], no part of the Procurement Documents may be reproduced (other than for the purpose of submitting a Tender) in any manner whatsoever without TNO's consent in writing. Tenders and all Annexes submitted by Tenderers as part of the Procurement Procedure will become TNO's property upon receipt.

2.2.25 TNO logo

The TNO logo may not be copied, altered or otherwise used on documents submitted by the Tenderer as part of the Procurement Procedure.

2.3 Further information (questions)

The Procurement Documents shall be prepared with the utmost care. Tenderers may request further information on the Procurement Procedure and/or the Procurement Guide up to the closing date and time "closing date for submission of questions" as stated in the schedule in Section 2.1. Said further information may, for example, address any lack of clarity, ambiguities, discrepancies. Further information should be requested within the time limit and in the manner described in this section. Questions and comments not submitted on time and/or correctly will in principle not be dealt with in the Information Notice, except in cases where this is deemed necessary and/or desirable at TNO's sole discretion.

Moreover, at the time of the above deadline, Tenderers will have the opportunity to ask reasoned questions on, or propose text or amendments to, the draft contract, as included in Annex **C02** and in the General Purchasing Conditions TNO, Annex **C03**. Text proposals will serve only to improve the Contract and must not affect its essence. TNO would point out that it reserves the right at all times to accept or not to accept these text or amendment proposals.

If the Tenderer fails to raise questions about and/or challenge to (lack of clarity, ambiguities or discrepancies in) the Procurement Procedure and/or the Procurement Guide and/or in the manner described in this section, or does not do so in a timely manner, it will forfeit its right to challenge any deficiencies identified at a later stage, e.g. in interlocutory proceedings.

Questions and/or comments should be communicated **exclusively** to the TNO contact person (see Section 2.2.5) using the "Standard Template for Tenderer Questions" in Annex **C01** ("editable" MS Excel file) prepared by TNO. Using the "pull-down" menu in this Excel file, the Tenderer should indicate which section of the Procurement Guide the question relates to. Once completed, Annex **C01** should be submitted via [the TenderNed messaging module](#).

TNO is therefore **not using the question module in TenderNed**. Questions submitted in this question module will not be considered.

The TNO contact person will compile the questions and/or comments, along with their responses, in anonymised form within one or more Information Notices. The final date for asking questions is included in the schedule in Section 2.1. The Information Notices will be published at www.TenderNed.nl as per the schedule in the table in Section 2.1.

All the questions and their answers should be considered an integral part of this Procurement Guide. The basic premise is that the Procurement Guide will be deemed final after publication of the last Information Notice.

TNO may decide to hold one or more additional briefing rounds. Parties will be informed of this in the Information Notice. Questions and comments submitted as part of an additional briefing round may relate solely to the contents of the immediately preceding Information Notice. Questions and comments that do not relate to the immediately preceding Information Notice may be disregarded by TNO – without notice.

The responsibility for submitting questions and/or comments in a timely and correct manner rests with the Tenderer. Questions raised after the expiry of the deadline will in principle not be answered in the Information Notice unless answering is necessary, in TNO's opinion, for the submission of a proper Tender.

TNO would advise Tenderers to wait until the last Information Notice is published before submitting their Tender as the Information Notice may contain further clarifications and amendments to the Procurement Guide that are relevant to the preparation of the Tender.

TNO would expressly remind Tenderers that it can answer their questions in confidence (Section 2.53(3) Aw). If a Tenderer does not wish to have a question answered in the Information Notice, the Tenderer must give reasons as to why a public answer would damage its legitimate economic interests. TNO will take a decision on whether or not to answer a question in confidence based on these reasons. If TNO decides not to do so, it will notify the questioner accordingly, giving reasons. The questioner will then have the option of withdrawing or submitting its question for the Information Notice.

2.4 Applicable law and disputes

This Procurement Procedure is governed by the laws of the Netherlands. The Preliminary Relief Judge at the District Court of The Hague shall have exclusive jurisdiction to settle disputes relating to the present Procurement Procedure. Tenderers should bring their challenges to all or part of the Procurement Procedure, to all or part of the information provided or to other aspects relating to the Procurement Procedure to the attention of the TNO contact person (see Section 2.2.5) at the shortest possible notice.

The period within which legal action must be taken against the Award Decision and/or the Procurement Procedure is twenty (20) calendar days from the date of the Award Decision. Any summons should be served within this period, which is a (contractual) expiry date, at TNO's address. If this objection period, also expiry date, is exceeded without legal proceedings having been commenced by service of a summons, any right to do so shall (inadmissible) lapse. The standstill period is automatically extended to the next working day if the standstill period ends at the weekend, on a public holiday or a so-called "notice-free day" [when bailiffs cannot issue writs].

A Tenderer wishing to initiate summary proceedings is requested to request foreclosures from TNO.

If a summons has been served within the standstill period, the relevant Tenderer is requested to send a copy of the served summons via TenderNed to the contact person for the Procurement Procedure no later than two (2) working days after service. This is because the processing of documents within TNO can lead to delays in processing the summons.

If a Tenderer institutes summary proceedings in a timely and valid manner in respect of the Award Decision and/or the Procurement Procedure, the Tenderer to which the contract has been provisionally awarded shall intervene in the summary proceedings. If the Tenderer to which the Contract has been provisionally awarded does not intervene, said Tenderer shall exercise the right to institute court proceedings or third-party proceedings in the event that the judgment in the first-instance summary proceedings orders the amendment or revocation of the Award Decision. This is because it is important for all the parties to obtain clarity as soon as possible and put all the arguments on the table in the first instance. If the standstill period is exceeded, this situation cannot be remedied.

Any Tenderer that has instituted summary proceedings is obliged to provide a copy of the summons when requested to do so by other Tenderers so that said Tenderer(s) can determine whether intervention is appropriate. Of course, it is up to the Tenderer that initiated the summary proceedings to determine whether or not confidential business information will be disclosed at that stage and, if so, which. If the Tenderer that initiated the summary proceedings does not (expeditiously) provide a copy of the summons to the Tenderer requesting it, TNO reserves the right to provide a copy of the summons itself. In doing so, TNO will determine at its own discretion whether confidential business information will be deleted and, if so, which.

If summary proceedings have been instituted in a timely and legally valid manner and the judgment does not oppose the conclusion of the Contract, TNO will be free to enter into the Contract. TNO is not obliged to await any appeal or proceedings on the merits. In other cases, TNO will consider the next steps to be taken based on the judgment in first instance.

2.5 Submission of the Tender

2.5.1 Digital tendering

The Tender consists of the completed and, where necessary, validly signed Annexes **A01 to A04**, the formats of which are appended as Annexes to the Procurement Guide. When the ESPD is validly signed, the Tender as such is also validly signed. The absence of a legally valid signature on the ESPD will render the Tender invalid.

For legally valid signatures, see Section 2.2.20.

For this Tender, TNO is using a digital procurement system via TenderNed. The Tender must be uploaded to the TenderNed digital vault not later than the date and time specified in the schedule in Section 2.1 under "Closing date for submission of Tenders". After uploading, the Tenderer will receive a transaction code via SMS. This code must be entered in TenderNed. The Tender is not actually submitted until the correct transaction code has been entered. The SMS code must therefore be entered within the tendering period for the Tender to be deemed complete and correct.

Tenders received late and/or Tenders not deposited in the digital vault and/or Tenders submitted by means other than via TenderNed will not be considered and will therefore be excluded from participation. Tenderers will remain at all times solely responsible for submitting their Tender on time and in the correct manner.

Tenderers are strongly advised to take careful note of the guide provided by TenderNed for the digital submission of Tenders, particularly as regards placing documents in the digital vault. In doing so, uploading should be completed with the tendering wizard (authorisation by SMS code).

Tenderers are advised to start uploading documents in good time. If a Tenderer experiences problems with the system due to a malfunction of TenderNed, the TNO contact person (Section 2.2.5) and TenderNed should be contacted without delay. In the event that a TenderNed malfunction actually occurs, as a result of which the submission of Tenders is not possible, shortly before the closing date and TNO has not taken note of Tenders that have been uploaded to the TenderNed digital vault on time despite the malfunction, TNO will extend the closing date for submission of Tenders pursuant to Section 2.109 Aw.

TNO further advises Tenderers to take note of the content of Section 2.109a Aw and, in accordance with the provisions of that section, to be prepared to submit the encrypted version of their Tender in a timely manner if occasioned by TenderNed malfunctioning.

2.5.2 Sending and grading Tender

The Tender consists of the following documents. Documents in **Part A** relate to the Tenderer. Documents in **Part B** relate to either Third Party(ies) whose experience/resources the Tenderer appeals to under the Eligibility Requirements and/or the Declaration of Willingness of Tenderer for the required insurance. The documents under **Part B** need to be submitted only if Third Party(ies) are invoked or if Tenderer is not (yet) in possession of either the insurance company's policy or satisfactory statement within the stipulated timeframe.

Part A Submission of the Tender

The Tender, under penalty of invalidity, must consist of the following components.

- Annex A01** European Single Procurement Document (Tenderer, if applicable: all individual Combination members; the individual Third Party or for the benefit of one or more subcontractors to be used for the work).
- Annex A02** Format for reference projects
- Annex A03** Price sheet
- Annex A04** Format for answering questions/fulfilling preferences, sub-award criterion: quality
- Annex A05** Maintenance/Services' (own format)

The above sheets must be completed in full. Only the ESPD need be validly signed.

Gather the pdf files, Annexes **A01** to **A05**, as separate "loose" files into a compressed file (zip file) named: "....." **_part A**. The Tenderer should replace the dotted line with all or part of its company name. Upload this compressed file to TenderNed's digital vault.

Part B Submission of supporting documents

- Annex B01** Format for Declaration as to Reliance on Financial and Economic Standing of Third Party or Parties
- Annex B02** Format for Declaration as to Reliance on Technical and Professional Competence of Third Party or Parties
- Annex B03** Format for Statement of Policy/Declaration as to Insurance

The above sheets must be completed in full. Only the ESPD need be validly signed.

Gather the pdf files, Annexes **B01** to **B03** as separate "loose" files into a compressed file (zip file) named: "....." **_part B**. The Tenderer should replace the dotted line with all or part of its company name. Upload this compressed file to TenderNed's digital vault.

3 Assessment of Tenderers and Tenders

3.1 Assessment team

A team of subject-matter and process experts has been constituted to conduct a qualitative assessment of the Tenders (assessment of the Tenders on the qualitative Award Criteria). The assessment team assesses the quality of the Tenders without having any knowledge of the financial part of the Tenders.

The members of the assessment team assess, on a strictly personal basis and independently, the elaboration of the qualitative (sub-sub-)award criteria for the Tenders. For these criteria, see section 6.1.2 and its elaboration in Chapter 8. In a meeting of the individual assessors, the average of the individual scores is then determined. The average of the individual scores then determines the overall score for a sub-sub-award criterion. Average scores are rounded to one decimal place.

In the announcement of the Intention to Award, TNO will state the numbers of completed points per (sub-)sub-award criterion. The total score for sub-award criterion: Quality (QY) has been arrived at by totalling unrounded scores on the sub-sub-award criterion, after which this total score is rounded to a whole number for the purpose of said announcement.

3.2 Assessment procedure

The assessment procedure is as described in the following sections.

- Section 4** : concerns the assessment of the timeliness, formal requirements and completeness of the Tender submitted.
- Section 5** : concerns requirements formulated in respect of Grounds for Exclusion and Suitability Requirements. If one or more Grounds for Exclusion apply and/or if a Tenderer fails to meet the Suitability Requirements, the Tenderer will be excluded/the Tender will be invalid.
- Section 6** : concerns the description of the assessment by TNO of the Tenders against the Award Criterion. The Award Criterion is assessed by allocating points to the Tender
- Section 7** : concerns the assessment of supporting documents and other documents requested by TNO from the intended beneficiary.
- Section 8** : this describes the assessment carried out by TNO in respect of the Minimum Requirements. This involves assessing TNO's requirements and preferences for the performance of the Contract, i.e. the Programme of Requirements and Preferences ("PoR"):

TNO assesses and ranks the Tenders on the basis of the Award Criterion: Best Value for Money (BVM), see Section 6 in this regard.

TNO may ask the Tenderer for clarification with regard to the submitted Tenders up to the end of the Procurement Procedure. The Tenderer is deemed to be willing and able to answer questions within 48 hours of sending the questions. If questions are not answered (in a timely manner), TNO may interpret the Tender in any manner it sees fit, based on the documents known to it.

4 Assessment of timeliness, formal requirements and completeness

4.1 Assessing timeliness of submission

The Tender must be submitted in a timely manner, i.e. within the tendering period (see Section 2.1). Tenders not submitted in a timely manner are invalid and TNO will discard them.

4.2 Assessing for other formal requirements and completeness

Tenders submitted by means other than through TenderNed will not be assessed and will be discarded. The foregoing is subject to any malfunctions of TenderNed, recognised as such by TenderNed.

The Tenders will be assessed as regards completeness and the formal requirements applicable in the Procurement Procedure, including at all events the legally valid signature. Tenders that are incomplete and/or fail to meet all the formal requirements will be declared invalid by TNO and discarded. Missing answers, documents, or data will result in exclusion if there is no rectifiable omission. Tenderers are reminded that TNO is not obliged to have deficiencies rectified. TNO has the discretionary power to offer a rectification option.

If – for whatever reason – a question cannot be answered or the requested data cannot be submitted in full or at all, this must be explicitly stated at the time of the Tender, together with reasons. Depending on the nature of the deficiency, TNO will assess whether the Tender is invalid, in which case it will be discarded, or whether the deficiency is amenable to rectification.

Deficiencies for which TNO offers a rectification option must be rectified within the timeframe as stated in the relevant request from TNO. If a deficiency is not rectified within the notified period or at all, the Tender will be invalid after all.

5 Assessment of Grounds for Exclusion and Suitability Requirements

5.1 Assessing Grounds of Exclusion

The Tenderer will be assessed in terms of the Grounds for Exclusion listed in the ESPD (Section III). The Tenderer declares in the ESPD whether the Grounds for Exclusion used are applicable or not at the time of tendering. Where one or more Grounds for Exclusion apply, the Tenderer will generally be excluded. The Tenderer will have the opportunity to give reasons in the ESPD why it should not be excluded after all because of self-cleansing measures or at least why exclusion would be disproportionate. TNO will take these reasons into account in its decision on the final exclusion of the Tenderer. The reasons must be included in or appended to the ESPD. Tenderers may not continue to submit and/or alter the reasons once the tendering period has elapsed.

If the Tenderer is a Combination and a Ground for Exclusion applies to any of the participants in that Combination, the Combination as a whole will be excluded. Each Combination member must submit its own legally signed ESPD.

If the Tenderer relies on the suitability of a Third Party or Parties as described in Section 2.2.10 of the Procurement Guide and a Ground for Exclusion applies to one or more Third Parties, TNO will reject its reliance on the suitability of the Third Party or Parties in question. If the Tenderer, whose reliance on a Third Party or Parties has been rejected, fails – after having been given the opportunity to do so by TNO – to rely (in a timely manner) on the resources of a substitute Third Party or Parties, or if the Tenderer does rely on a substitute Third Party or Parties but fails to comply fully or at all with the requirements set for that purpose, the Tenderer will be excluded from participating in the Procurement Procedure. The substitute Third Party or Parties must be proposed within seven (7) calendar days of a request to that effect from TNO, submitting all the documents requested in the Procurement Documents for that purpose. Proposing a substitute Third Party is not considered an amendment to the Tender. If a Tenderer is permitted to propose a substitute Third Party, the Tenderer may only substitute the Third Party while submitting the relevant documents in this connection. Other parts of the Tender, including, but not limited to, the elaboration of the award criteria remain unchanged.

The completed and validly signed ESPD will suffice in the first instance as evidence that the Grounds for Exclusion do not apply to the Tenderer. At TNO's request, the Tenderer to which TNO intends to award the Contract will provide – by the date specified in Section 7.1 of the Procurement Guide – the supporting documents referred to in section 7.1. If the Tender is submitted in Combination, all the Combination members must submit the supporting documents listed below. If the Tenderer relies on the standing/resources/experience of one or more Third Parties, then the supporting documents listed below from each Third Party should be submitted.

Tenderers are reminded that it may take several weeks to obtain some supporting documents. Tenderers are therefore advised to request the supporting documents at the earliest possible stage so that they can be supplied in a timely manner – in response to any request from TNO. TNO would point out that any Tenderer relying on a Third Party is itself responsible for the timely submission of supporting documents in respect of the Third Party's ESPD. TNO therefore advises Tenderers to inform, in a timely and appropriate manner, Third Parties on whose suitability they rely which documents may be requested by TNO in the event of award to the Tenderer and the time required to obtain these documents.

Failure to obtain supporting documents in a timely manner or at all remains at the Tenderer's risk. If the supporting documents are not supplied in a timely manner and/or complete, the Tenderer will still be excluded. If a supporting document has not been obtained in a timely manner, but has been requested in good time and the failure to obtain it is not due to a circumstance within the Tenderer's sphere of risk, the Tenderer will not be excluded. To this end, the Tenderer must demonstrate that the relevant supporting document has been requested not later than two (2) working days after publication of the announcement of the Procurement Procedure.

5.2 Assessing Suitability Requirements

The Tenderer must, at the time of Tendering, possess a certain minimum level of expertise and ability to perform the contract: the Suitability Requirements.

The Tenderer will be assessed on the Suitability Requirements. If the Tenderer relies on the suitability of a Third Party or Parties as referred to in Section 2.2.10 of the Procurement Guide, TNO will assess whether the Third Party or Parties meets the specified Suitability Requirements, for which the Tenderer relies on said Third Party or Parties.

The Suitability Requirements refer to the required financial and economic standing, technical and professional ability and professional competence that the Tenderer must meet in order to be eligible to submit a Tender.

The Tenderer must meet all the Suitability Requirements at the time when the Tender is submitted. If the Tenderer fails to meet all the Suitability Requirements, with or without relying on one or more Third Parties, the Tender will be invalid.

If tendering in Combination, the Combination as a whole must meet the Suitability Requirements and in principle not all the individual Combination members. However, this may be different for a specific Suitability Requirement.

5.2.1 Financial and economic standing

5.2.1.1 Insurance

The Tenderer must be insured against business liability and/or professional liability, with cover of at least € 1,250,000. per loss-causing event (*€as stated in the General Purchasing Conditions*) or series of related events, or be willing and able to arrange said insurance cover in the event of an Intention to Award. The Tenderer is responsible for ensuring that, if awarded Contract, it remains insured at least in accordance with this requirement during the term of the Contract. The Contractor will inform TNO without delay of any changes to the insurance policies. If the Contractor's insurance does not or no longer meets this Suitability Requirement during the term, TNO will be entitled to dissolve the Contract without notice of default or judicial intervention and without being liable to pay compensation to the Contractor.

Ticking the "yes" box in Part IV of the Tenderer's ESPD (Annex **A01**) will suffice in the first instance as evidence that the Tenderer meets this requirement.

At TNO's request, the Tenderer whose Tender was ranked first will provide the evidence of insurance within the set timeframe as referred to in Section 7.1. This supporting document comprises a policy showing the required insurance cover, the insurance contract, the policy schedule or a satisfactory declaration from the insurance company showing that the Tenderer is insured as required in the Procurement Documents. If a group policy is submitted, the Tenderer must supply a copy thereof to demonstrate that it is jointly insured.

If the Tenderer does not (or not yet) have the insurance company's policy or satisfactory declaration in its possession within the set timeframe, it should sign a Declaration of Readiness instead (Annex **B03**). By signing this declaration, the Tenderer declares that it will provide a copy of the policy or of a satisfactory statement by the insurance company within seven (7) calendar days after the notification by TNO that it intends to enter into the Contract with the Tenderer under the suspensive condition of the required insurance, based on the assessment of the supporting and other documents already submitted (see Sections 7.1 and 7.2). Said notification will be issued by TNO only after the standstill period has expired without summary proceedings being instituted or – where summary proceedings have been instituted – the relevant judgment states that the Award Decision can be upheld. The Contract will be not be entered into until such time as evidence of the Tenderer being adequately insured has been received. If the Tenderer is unable to provide the required insurance policy or a satisfactory declaration from the insurance company within the set timeframe, the Contract will not be concluded and TNO will retain the right to award the Contract to the Tenderer which would be ranked in first place after the number one was eliminated in accordance with the assessment system, and which has stood by its Tender.

5.2.2 Technical and professional competence

Competence requirements state the degree to which Tenderers may be considered capable of performing the actual activities under the present Contract as required.

5.2.2.1 Reference projects

The Tenderer should demonstrate experience in the required core competences by providing details of reference projects. The Tenderer should cite one reference project for each core competence. The Tenderer may cite the same reference project to fulfil the different core competences.

As evidence that the Tenderer has experience in the core competences listed below, the Tenderer shall cite the required reference projects immediately upon submission of the Tender. To this end, the Tenderer should submit a fully completed Annex **A02** for each core competency. If the Tenderer uses one reference for multiple core competences, then a completed Annex **A02** must be submitted for each core competence. The completed Annex **A03** must show that the reference project cited fulfils all aspects of the core competence. Additions or amendments to the details in Annex **A02** are not permitted after the expiry of the tender date.

If the Tenderer relies on the technical and professional competence of a Third Party or Parties, the Tenderer shall submit for each core competence for which it relies on the relevant Third Party or Parties an Annex **A02** fully completed by said Third Party or Parties.

If a project is cited that has not yet been (fully) completed, only the actual results achieved under the current Contract may be stated and a forecast of results is not sufficient.

TNO has identified the following core competences that correspond to the desired experience in key areas of the present Contract.

Core Competence 1: The Tenderer has experience in building cryostats as defined in this Tender (e.g. meeting all requirements).

Reference project: The Tenderer must have delivered a dilution cryostat, with simultaneously more than 20 RF lines and 100 DC lines and a Solenoid Magnet, that fulfils Core Competence 1 in the past 3 year from the date of Announcement of this Procurement Procedure and whose contract value was a minimum of € 600.000,00 excluding VAT. The closed-cycle

refrigerator cryostat system should have been delivered in accordance with the conditions agreed at the time, including the completion date and budget.

TNO reserves the right to check references with the referee without involving the Tenderer. TNO assumes that the Tenderer has informed the referees accordingly. The information obtained by TNO from the referent will be taken into account in the assessment of the Tender.

If the Tenderer has not demonstrated in its Tender that it has the required experience in all the core competences, this will result in the Tender being rendered invalid.

5.2.3 Professional competence

By completing the ESPD (Annex **A01**) and ticking the "yes" box in Part IV, the Tenderer declares that it is registered in the professional or trade register in accordance with the regulations of the Member State in which it is based.

At TNO's request, the Tenderer to which TNO intends to award the Contract within the period specified in Section 7.1 of the Procurement Guide will provide relevant evidence:

- for enterprises based in the Netherlands, an extract from the trade register of the Chamber of Commerce must be submitted, which is not more than six months old at the time of submission of the Tender. For enterprises based outside the Netherlands, a similar document should be appended in accordance with the applicable regulations of the relevant country in which the enterprise is based;
- where the Tenderer is a partnership or general partnership, the Tenderer shall submit the extracts of those that form the partnership/general partnership (if recorded in the trade register) as well as a declaration signed by all the partners showing the power of representation for the purposes of this Tender;
- where the Tenderer is a Combination, the Tenderer shall submit extracts from all participants in that Combination, and;
- where the Tenderer submits a Tender relying on the standing/capacity/experience of one or more Third Parties, the Tenderer shall submit extracts from all Third Parties or subcontractors, as the case may be.

5.2.4 Legal suitability to perform an assignment

On 8 April 2022, the EU adopted a fifth sanctions package regarding the Russian war in Ukraine (Council Regulation 2022/576). In that package, contracting authorities are prohibited from granting assignments to (1) natural persons with Russian nationality or legal entities established in Russia, (2) legal entities that are owned for 50% or more by one of the natural persons or legal entities referred to under (1), and/or (3) natural persons or legal entities acting in the interests or on the instructions of a natural person or legal entity referred to under (1).

TNO applies the above requirements as a suitability condition for this Procurement Procedure. A Tenderer will be legally unsuitable to perform the assignment (Section 2.90(4) of the Dutch Public Procurement Act (*Aanbestedingswet*)), and its Tender will be invalid, if:

- 1) the natural persons have Russian nationality or the legal entities are domiciled in Russia; and/or
- 2) they are legal entities that are owned for 50% or more by natural persons or legal entities referred to under (1); and/or
- 3) they are natural persons or legal entities acting in the interests or on the instructions of a natural person or legal entity referred to under (1).

The Tenderer must therefore demonstrate in its Tender that:

- 1) the Tenderer does not have Russian nationality and/or is not domiciled in Russia; and
- 2) the Tenderer is not owned for 50% or more by a natural or legal person referred to under (1); and
- 3) the Tenderer is not acting in the interests or on the instructions of a natural or legal person referred to under (1), including the payment of monies to a natural or legal person referred to under (1), whether or not it is legally obliged to do so and whether or not it is actually possible at present.

If one or more of the above three (3) requirements cannot be demonstrated, the Tender will be invalid.

Where the Tenderer tenders in Combination, this requirement shall apply to all the individual Combination members. Where the Tenderer relies on the standing/resources/experience of one or more Third Parties, this requirement shall also apply to the Third Parties on whose standing/resources/experience the Tenderer relies. If the Tenderer wishes to use one or more subcontractors during the performance of the Contract, the Contractor will have to demonstrate – for that subcontractor – that it meets this requirement at the time a subcontractor is presented to TNO for approval.

Ticking the "yes" box in Part IV of the Tenderer's ESPD (Annex **A01**) will suffice in the first instance as evidence that the Tenderer meets this requirement.

To this end, the Tenderer to which TNO intends to award the Contract within the set timeframe as referred to in Section 7.1, shall provide the means of proof relating to this Suitability Requirement. This concerns the following documents:

- a) a recent (not older than six (6) months from date of Tender) extract from the trade register reflecting the most recent state of affairs; and
- b) an up-to-date report on the holding structure (where the Tenderer is part of a holding structure) showing the direct and indirect ownership relationships of the Tenderer; and
- c) a copy of the Tenderer's current articles of association.

In addition, the Tenderer shall declare categorically not to supply products - including semi-finished and finished products - listed in Annex XVII of the European Commission Regulation (EC) No 833/2014 on Russia Sanctions. When supplying products covered by this Annex XVII, the Tenderer shall provide as proof a Mill Test Certificate (MTC), or similar certificate such that it meets the requirements and obligations to establish the country of origin.

The Tenderer must continue to meet the Suitability Requirement. TNO will be entitled to verify this during the term of the Contract. If it becomes apparent during the term of the Contract that the Contractor does not meet – or no longer meets – the Suitability Requirement, TNO will be entitled to terminate the Contract with immediate effect, without being liable to pay damages to the Contractor and without the necessity of a notice of default or judicial intervention.

6 Assessment of Award Criterion

TNO assesses and ranks the Tenders based on the Award Criterion: Best Value for Money (BVM). The Tenderer with the highest overall score is deemed to have submitted the 'Most Economically Advantageous Tender' and is therefore provisionally awarded the contract.

6.1 Award Criterion: Best Value for Money (BVM)

This criterion is divided into the following sub-award criteria, with the corresponding weighting factors, where the assessment of the sub-award criteria: Price (TP, Total Price) and Quality (QY) is scored by setting a number of point scores to be achieved.

Award Criteria	Max. points score
Price (TP, Total Price)	200
Quality (QY)	800
Total	1000

The Tender with the highest total points score will be designated as Best Value for Money "BVM", on the basis of which TNO intends to award the Contract. See also Section 6.2 Award.

Point scores for each sub-award criterion will be rounded to one (1) decimal place. Total points are scored for each sub-award criterion by adding up unrounded point scores. In the announcement of the Intention to Award, TNO will state the rounded points scores allocated to each (sub-)sub-award criterion.

If the Tenderers with the highest Total Score have an equal Total Score, the Contract will be provisionally awarded to the Tenderer with the highest score for the sub-sub-award criterion QY1. If these scores are also equal, a draw will be held among the Tenderers with equal scores which are eligible for award. The protocol for the draw, if any, will be shared with the Tenderers among which lots will be drawn.

If, after the provisional award, the Tenderer with the highest score nevertheless proves to be invalid/is excluded from the procedure, the Tenders will be reassessed on the basis of the Award Criterion: Price, after which a new total score will be determined. TNO will award the Contract again based on this reassessment. This is to avoid what is referred to as the "ranking paradox".

6.1.1 Sub-award criterion: Price TP (Total Price)

To determine the sub-award criterion: TP (Total Price), TNO asks the Tenderer to use the Price Sheet prepared by TNO (in MS Excel) according to Annex **A03** for its price proposal. This Price Sheet should be completed and appended to the Tender. The Tenderer should strictly follow the outline of the Price Sheet and complete it in full. If the Price Sheet has not been submitted in full and/or correctly or at all, TNO will declare the Tender invalid and exclude it from further participation in the Procurement Procedure. Changing the format and layout of the Price Sheet (Annex **A03**) will also invalidate the Tender.

The distribution of the maximum number of point scores to be achieved for TP is given in the table below:

Criterion	Max. points score
Price TP 1 – Closed-cycle refrigerator cryostat system, this includes: - Two year warranty; - (Critical) Design review; - Site Acceptance Test (SAT); - Installation on site; - Operator & (basic) maintenance training for 4 people; - Delivery according Incoterms Delivered Duty Paid (DDP), 2020 (location TNO Delft, the Netherlands)	200
Price TP 2 – Maintenance/services A one-year 'basic' maintenance contract multiplied by five (5) years (see section 1.5 for more information).	200
Total TP = TP1 + TP2	200

When completing the Price Sheet, the following Minimum Requirements apply:

- 1) Prices and expenses should be stated in euros excluding VAT, and to two (2) decimal places;

- 2) The prices/rates listed in the Price Sheet are all-inclusive. This means that all the costs/services/obligations/etc. required for the performance of the Contract in accordance with the contract terms have been factored into the prices and rates. During the performance of the Contract, the Contractor shall not be entitled to any other and/or additional remuneration other than that in accordance with the Price Sheet;
- 3) The Price Sheet should include a price proposal on all the required items. The Tenderer shall use the Price Sheet prepared by TNO unchanged;
- 4) The Tenderer is solely responsible for stating figures and adding them correctly;
- 5) The prices quoted by the Tenderer should be based on the Procurement Documents without reservations of any kind;
- 6) Specific Minimum Requirements or additional instructions relating to the Price Sheet are included in the "additional instructions" tab and are accepted by the Tenderer reservations of any kind;
- 7) The prices and rates quoted in the Tender will apply in the event of final award on commencement of the Contract and will be fixed for the first two (2) contract years of the Contract, with the exception of the listed prices for the optional second closed-cycle cryogen free cryostat, which should be fixed for each of the mentioned period.

The value of the lowest TP (Total Price) is determined on the basis of the cumulative costs in the Price Sheet defined by TNO.

The Tenderer with the lowest TP, being the lowest total price calculation, will be awarded the full number of points, set by TNO at 200 points. For the remaining Tenderers, the number of points to be obtained will be determined on a pro rata basis, with points deducted from the maximum number of points to be obtained.

Total points for TP (Total Price) are calculated according to the following formula:

$$\text{Total Points} = 200 - \left\{ \frac{(I - LI)}{LI} \times 200 \right\}$$

Where:

Number of points = number of points obtained for sub-award criterion TP

I = Tender with "TP"

LI = Tender with the lowest "TP"

If $I \geq 2 \times LI$, then zero (0) points are awarded for sub-award criterion TP.

The total score is rounded to whole points.

Note: The maximum available budget for this tender is € 1.000.000,-- (excluding VAT). If the tender price exceeds this ceiling price then the tender is deemed to be invalid with exclusion as a result.

6.1.2 Sub-award criterion: Quality (QY)

Section 8, the Programme of Requirements and Preferences (hereinafter "PoR"), of the Procurement Guide describes the requirements to be met by the performance of the Contract.

The PoR also contains a number of preferences with regard to the quality of the requested service/supply. These preferences are set out in the form of a questionnaire. By filling in the preferences section and answering questions, Tenderers can differentiate themselves in terms of quality.

The Tenderer is asked to provide notes for each preference/question, answering the subject-matters listed in the questionnaire.

The Tenderer shall answer the open questions clearly, unambiguously and point by point.

When elaborating an answer for each open question, the Tenderer should respect the set maximum number of A4 pages (font size at least 10 points and line spacing at least 1.5). Tenderers should bear in mind, when elaborating the preferences, that said answers become part of the Contract and must therefore be capable of fulfilment by the Tenderer.

TNO bases the assessment of the answers on the set maximum per answer. This means that Annexes or references to them should not form part of the answer in order to "get round" the set maximum number of A4 pages in this way. However, illustrations, diagrams, organisational charts and sample reports can form part of the answer. Annexes should not form part of the answer and will not be included in the assessment. If the set maximum is exceeded, the excess number of A4 pages will not be included in the assessment. Any part of the elaborated answer that exceeds the maximum will not become part of the Contract.

The elaboration of the preferences will be assessed in absolute terms. It is therefore possible that more than one Tenderer has the same score for the relevant answer to the question asked.

The answers to the questions and therefore the compliance with preferences should be structured in the manner and order as specified in Section 8 and can be submitted using the Tenderer's own A4 format, subject to the aforementioned requirements.

The distribution of the maximum number of points to be achieved for sub-sub-award criterion: Quality (QY) is shown in the table below.

Section 8 Sub-sub-award criterion: Quality	Max. points
8.1 QY 1 Extra cooling power	150
8.2 QY 2 Extras Vector magnet	100
8.3 QY 3 Interchangeability magnets	50
8.4 QY 4 Interface and Control	100
8.5 QY 5 Additional RF/DC Components	150
8.6 QY 6 Loader and Storage for Inserts	100
8.7 QY 7 Maintenance and Support	150
Total	800

The assessment of the answers to the questions as posed under the preferences in the PoR is carried out in the manner described in Section 3.1. As stated in Section 3.1, the average of the individual scores determines the corresponding total score. The average is determined by first determining the score per assessor (percentage * maximum score) and then averaging that score across all assessors (individual scores summed/number of assessors).

Each percentage referred to in the table equals a percentage of the maximum score per preference.

Valuation	Score	Notes to valuation
No/poor answer	0%	No answer given or answer is not good, i.e. it is not in accordance with TNO's (minimum) preference(s)
Unsatisfactory answer	20%	Answer is not complete (the preference is not fully elaborated), not sufficient, not satisfactory, i.e. it is not fully in line with TNO's preference(s)
Satisfactory answer	50%	Answer is sufficient, satisfactory, adequately reflects TNO's preference(s)
Good answer	85%	Answer is good, i.e. the answer accurately reflects TNO's preference(s)
Very good answer	100%	Answer is outstanding, i.e. the answer exceeds TNO's preference(es)

The following questions will be considered when assessing compliance with the preferences:

- Is the answer specific, realistic, achievable, effective, complete and consistent?
- To what extent does the answer reflect TNO's situation and the Programme of Requirements and Preferences?
- Does the Tenderer address the requested elements, subject-matters and aspects as stated in the relevant preference/question and the Programme of Requirements and Preferences?

The assessment will be based on the overall impression given by the answer given. The preference does not involve separate assessment aspects or criteria.

6.2 Award of Contract

6.2.1 Notification of the Award Decision

All Tenderers will receive from TNO, expectedly on the date referred to in the schedule under Section 2.1, the notification of the final result of the assessment of the Tenders and the intended Award Decision.

In this notification of the Award Decision, TNO will indicate the Tenderer to which it intends to award the Contract, as well as, for unsuccessful Tenderers, reasons for their rejection.

6.2.2 Challenge

If a Tenderer disagrees with the Intention to Award as notified by TNO, it will be given the opportunity to challenge the Intention to Award within twenty (20) calendar days after the date of publication of the Intention to Award in the manner described in Section 2.4 of the Procurement Guide.

6.2.3 Final award

Once the standstill period has expired without summary proceedings having been instituted or, if summary proceedings have been instituted in a timely manner, the judgment in first instance does not oppose final award, TNO will contact the successful Tenderer as soon as possible to proceed with the award, except where a situation exists in which summary proceedings have been instituted in a timely manner. No final award will be made until the Contract has been validly signed by both Parties. If this is not the case, there is no question of TNO being bound in any way.

Kick-off meeting

TNO may intend to hold a kick-off meeting before the final contract is awarded. The Kick-off meeting objective is to cross-check and clarify (if any need) the Supplier proposed design including the complete set of compliance against customer applicable documentation at the issue that is relevant for the contract/kick off.

Digital Signature of Contract

To this end, TNO signs its Contracts using a so-called advanced digital signature tool, known as ValidSign. On receipt of the provisional award, the Tenderer is requested to provide the e-mail address and personal mobile phone number of the organisation's authorised signatory. The telephone number is needed to make the Contract legally binding (using SMS authentication).

On receipt of the final award, the Tenderer receives an e-mail containing a link to the documents to be digitally signed and clicks on "sign the documents" and is automatically redirected to ValidSign where the signature fields are visible. To sign, the Tenderer clicks "click to sign" and then "confirm". Once the documents have been digitally signed by the Tenderer and TNO, the Tenderer can download the digitally signed documents within a timeframe of thirty (30) days.

Progress meetings

After the Contract award, the Tenderer is required to participate in regular progress meetings. These meetings shall be held on a monthly basis. The purpose of these progress meetings is to ensure effective communication, monitor the progress of the Contract, address any issues or concerns, and deadlines are being met. Each progress meeting shall include, but is not limited to, the following agenda items:

- Review of the current status
- Discussion of completed and upcoming tasks
- Identification and resolution of any issues or risks
- Review of timelines and milestones
- Any other relevant topics as agreed upon by both parties

The Tenderer must ensure that key personnel, including the project manager and relevant team members, attend these meetings. TNO will also designate representatives to attend the meetings.

7 Assessment of supporting and other documents from intended beneficiary

7.1 Requesting supporting and other documents from intended beneficiary

The Tenderer to which TNO intends to award the Contract must submit the supporting documents for the ESPD and any other documents and/or data within seven (7) calendar days after the date of TNO's request.

The following supporting documents must be supplied to TNO by the Tenderer to which TNO intends to award the Contract within seven (7) calendar days after the date of the request:

- Certificate of Conduct for Procurement (not more than two years old as at the date for submission of the Tender): The Tenderer, where applicable: all individual Combination members; all individual Third Parties;
- Declaration of Payment Behaviour from the Dutch Tax and Customs Administration (not more than six months old as at the date for submission of the Tender): The Tenderer, where applicable: all individual Combination members; all individual Third Parties;
- Extract from trade register (not more than six months old as at the date for submission of the Tender): The Tenderer, where applicable: all individual Combination members; all individual Third Parties;
- ISO 9001 Certification or similar measures;
- ISO 14001 Certification or similar measures;
- Insurance policy or Declaration of Readiness as to insurance (Annex **B03**);
- If applicable: Declaration as to Reliance on Financial and Economic Standing of Third Party or Parties (Annex **B01**);
- If applicable: Declaration as to Reliance on Technical and Professional Competence of Third Party or Parties (Annex **B02**).

Certificate of Conduct

The Certificate of Conduct (GVA; Dutch: Gedragsverklaring Aanbesteden) is a statement from the Minister of Security and Justice. The GVA indicates that an investigation into the natural or legal person concerned has not resulted in any objections in connection with the application and tendering for public contracts, special sector contracts, concession agreements for public works and/or services or competitions. After a provisional award, the provisionally awarded tenderer(s) must submit a valid GVA as proof that the grounds for exclusion do not apply to them.

TNO will request the intended beneficiary to submit the supporting documents. TNO will assess the following aspects of these documents:

- ascertain whether supporting documents submitted by Tenderer are submitted in a timely manner
- assess whether all the supporting documents requested by TNO have been submitted and whether the supporting documents received are complete. The absence of all or part(s) of supporting documents and/or other data will result in exclusion if there is no rectifiable omission. Depending on the nature of any deficiency, TNO will assess whether, as a result of that deficiency in the supporting documents, the Tender is invalid after all and will be disregarded, or whether the deficiency is amenable to rectification. The offer of rectification is a discretionary power of TNO and not a (legally enforceable) obligation.
- assess whether the Tenderer demonstrates through the supporting documents submitted that it complies with what it has declared through its Tender.

If the supporting documents are not, not completely and/or not timely received, or if the supporting documents show that the information in the Tender is incorrect, the Tenderer will be excluded after all/the Tender will be disregarded after all. If this is the Tenderer with the lowest price, the score for the sub-award criterion on price (TP) will be recalculated, after which a new ranking will be determined. If this was not the Tenderer with the lowest price, the ranking order will be maintained and the Contract will be provisionally awarded to the Tenderers ranked in order of succession.

TNO is also entitled to verify the Tender from the Tenderer to which it intends to award the Contract. If this verification shows that the Tender contains inaccuracies or cannot be fulfilled, the Tender will be disregarded after all. If this is the Tenderer with the lowest price, the score for the sub-award criterion on price (TP) will be recalculated, after which a new ranking will be determined. If this was not the Tenderer with the lowest price, the ranking order will be maintained and the Contract will be provisionally awarded to the Tenderers ranked in order of succession.

7.2 Contract subject to condition precedent

If the Tenderer is unable to provide a copy of the policy, nor a satisfactory statement from the insurance company, within the timeframe referred to in the previous section, but has signed the Declaration of Readiness in accordance with Annex **B03** then TNO will notify the Tenderer after a positive outcome of the assessment of the other (supporting) documents and after the standstill period has expired without summary proceedings having been instituted or – where summary proceedings have been instituted within the standstill period – the relevant judgement shows that the Award Decision can be upheld, that TNO will enter into the Contract with the Tenderer subject to a condition precedent. This condition precedent implies that the Contract will only actually be entered into if, after a timeframe of seven (7) calendar days (see Section 7.1), the Tenderer provides TNO with a copy of the required insurance policy or a satisfactory statement from the insurance company showing that the Tenderer is insured as required in the Procurement Documents. The Contract will not be entered into until after receipt of either document.

If the Tenderer is unable to provide the required insurance policy or a satisfactory statement from the insurance company within the set timeframe, the Contract will not come to fruition and TNO will retain the right to award the Contract to the Tenderer which would be ranked in first place after the number one which was eliminated in accordance with the assessment system.

8 Programme of Requirements and Preferences

TNO assesses the Tenders against the Programme of Requirements and Preferences. The Programme of Requirements and Preferences includes Minimum Requirements, Performance Requirements and Preferences. The Minimum Requirements must be met on penalty of invalidity at the time of submission of the Tender, the Performance Requirements only at the time of performance of the Contract and the Preferences must be worked out by Tenderers as part of the award of the Contract.

TNO has the right, but not the (legally enforceable) duty, to ask for clarification as regards meeting the Minimum Requirements and how the Tenderer expects to meet the Minimum Requirements.

As stated in Section 6.1.2 of this Procurement Guide, in addition to the Minimum Requirements and performance requirements, this PoR also contains a number of preferences as regards the quality of the supply. The preferences must be answered/elaborated upon by the Tenderer in the Tender in response to the qualitative sub-award criteria.

Any changes to the PoR that may occur during the performance of the Contract will be implemented in accordance with the conditions of the Contract. In this regard, TNO will ensure that no material amendment will be made to the Contract.

The objective and scope of the Contract (including this PoR) as well as a description of the current conditions have been described in Section 1.

This Programme of Requirements and Preferences is laid out in the following sections:

Requirements

- 8.1 - Cryostat system requirements
- 8.2 - Cryostat requirements
 - 8.2.1 – Shields & Plates requirements
 - 8.2.2 – Inserts & loaders requirements
 - 8.2.3 – RF interface requirements
 - 8.2.4 – DC interface requirements
 - 8.2.5 - Magnet requirements
- 8.3 - Cryostat supporting frame requirements
- 8.4 - Software and system control requirements
- 8.5 - Gas handling system requirements
- 8.6 – Compressor requirements
- 8.7 – Facilities requirements
- 8.8 - Contractual aspects

Preferences

- 8.9.1 – QY1: Extra Cooling Power
- 8.9.2 – QY2: Extras Vector magnet
- 8.9.3 – QY3: Interchangeability magnets
- 8.9.4 – QY4: Interface and Control
- 8.9.5 – QY5: Additional RF/DC Components
- 8.9.6 – QY6: Loader and Storage for Inserts
- 8.9.7 – QY7: Maintenance and Support

Definitions, abbreviations and acronyms

May	Expresses permissive guidance.
Shall	Expresses a characteristic which is to be present in the item which is the subject of the specification, i.e. "shall" expresses a binding requirement.
Should	Expresses a target or goal to be pursued, but not necessarily achieved.
Will	Expresses a declaration of intent on the part of a party, usually the sponsoring or acquiring organization. "Will" does not express a binding requirement. "Will" may also be used in cases where the simple future tense is required, for example, "The operating system will be supplied by the government.". Will may also express simple futurity. Any statement which employs the term "will", if used in chapter 4, should be present as a note so as to be clearly distinguishable from requirements.
Goal	The desired value for a requirement.
Threshold	The acceptable value for a requirement.
Remark	Information that is meant to clarify or supplement a requirement.
Rationale	Reasons or logical basis for a requirement.
Accuracy	The degree to which the result of a measurement, calculation, or specification conforms to the correct value or a standard.
Reproducibility	The degree of agreement between measurements or observations conducted on replicate specimens in different locations by different people, as part of the precision of a test method.
Sample	Object to be measured.
State	A required, permitted or prohibited condition of the system.
Mode	A group of functions related to an aspect of use.

Test (T)	The operation of the system, or part of the system, using instrumentation or other special test equipment to collect data for later evaluation.
Demonstration (D)	The operation of the system, or a part of the system that relies on observable function not requiring the use of the instrumentation, special test equipment, or subsequent analysis.
Analysis (A)	The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpolation, or extrapolation of test results.
Inspection (I)	The visual examination of system components, documentation, etc.
Certification (C)	A declaration by designated stakeholder, usually the supplier or developer.
Review (R)	Detailed review of the received specification of the supplier or developer on the (sub-)system.

8.1 Subject-matter Cryostat System Requirements

Requirement	Description	Validation Method
Requirement 8.1.005	The supplier shall deliver a closed-cycle cryogen-free cryostat system that meets all the stated requirements in this document at the same conditions and time, unless indicated otherwise in a specific requirement. Rationale: Required to meet the function of the system.	R
Requirement 8.1.010	The closed-cycle cryogen-free cryostat system shall be an existing product, which has been produced, tested and delivered at least once before. Rationale: The facility is not suitable for testing equipment, the system shall be an existing and tested product.	R
Requirement 8.1.015	The cryostat shall be electrically isolated from the gas handling system, compressor, control unit and the cryostat supporting frame. Rationale: This is required to avoid damage on the device and other components around the cryostat during electric faults as well as preventing interference via ground loops.	T
Requirement 8.1.020	The cryostat pumping system shall be able to generate and maintain a pressure below 1e-5 mbar (millibar) within the OVC (Outer Vacuum Chamber) when the cryostat is cold. Rationale: For proper insulation of the cryostat from the lab environment and to avoid freezing of contaminants on the sample.	D
Requirement 8.1.025	The cryostat shall be able to transition between RT (Room Temperature) and cryogenic base temperatures without requiring any physical action from the operator besides performing the cooldown or warmup commands via the remote software. Rationale: Important to reduce overhead in the operator training.	D
Requirement 8.1.030	The cryostat shall be able to pump-down and vent without requiring any physical action from the operator besides performing the command via the remote software. Rationale: Important to reduce overhead in the operator training.	D
Requirement 8.1.035	The system shall be of the type closed-cycle cryogen-free cryostat. Rationale: Required for the type of devices and experiments.	R
Requirement 8.1.040	The full setup containing cryostat, compressor, gas handling system and controls shall be CE certified. Rationale: Safety and quality of the cryostat	R

TNO expects that the different sub-systems deliver specific functions in order to facilitate the main goal. In Figure 1, a product tree is shown that demonstrates how TNO envisions the system. To each box depicted in Figure 1 the corresponding requirements will be shown in the following sections of this document.

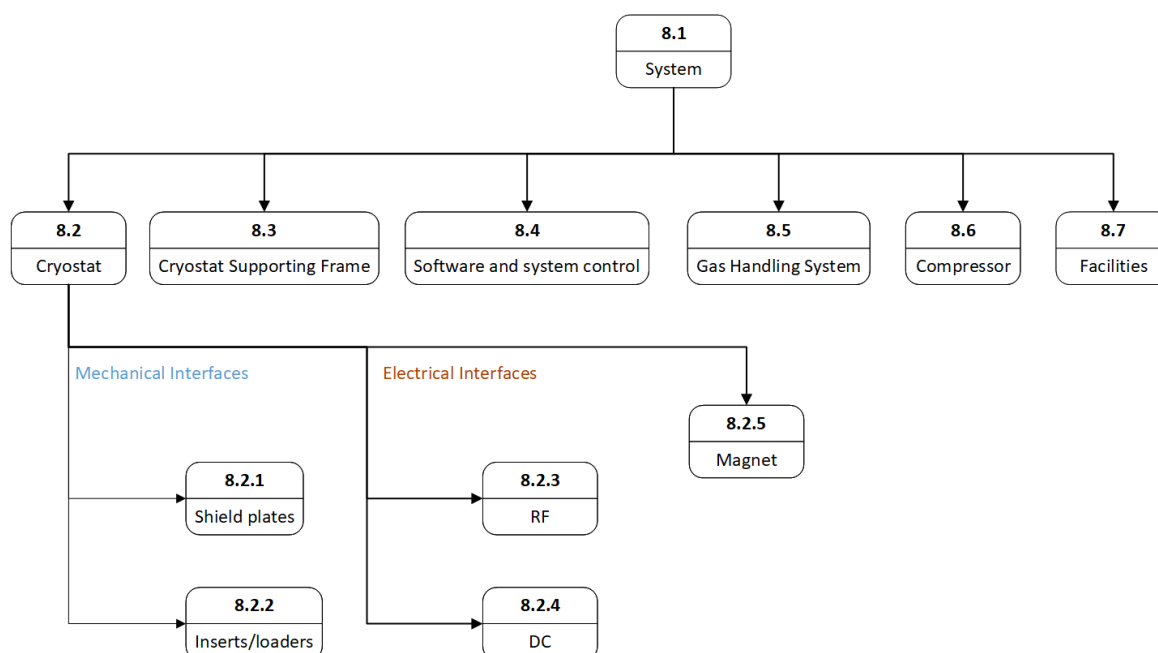


Figure 1 - Different Subsystems of the system

8.2 Subject-matter Cryostat Requirements

Requirement	Description	Validation Method
Requirement 8.2.005	The Cryostat shall have a base temperature of 10 mK (milli-Kelvin) or less, as measured on the mixing chamber (MXC) plate. Rationale: Most qubit experiments performed between 10 - 20 mK.	D
Requirement 8.2.010	The cooling power of the Cryostat at 100 mK shall be at least 400 uW as measured on the MXC plate. Rationale: Cooling power required for different experiments (multiple experiments at the same time).	D
Requirement 8.2.015	The Cryostat shall be able to operate continuously at 10 mK or below at the mounting plate (MXC plate), without heat load applied, for at least 1 month. Rationale: Various more complicated experiments can take as long as 2 weeks.	A
Requirement 8.2.020	The Cryostat shall be monitored by at least one thermometer per stage with a resolution and accuracy of 0.1 Kelvin or better. Rationale: Required to make sure that the temperature is known during each experiment.	D
Requirement 8.2.025	The temperature of the MXC shall be monitored by a thermometer with a resolution and accuracy of 0.1 mK or better. Rationale: Required to make sure that the temperature is known during each experiment.	D
Requirement 8.2.030	The Cryostat shall ensure that the temperature of the MXC plate has a maximum peak to peak variation of: 1 mK, when operated at a temperature below 100 mK with a constant heat load over a period of 2h. 1%, when operated at a temperature above 100 mK with a constant heat load over a period of 2h. Rationale: To ensure a stable environment for measurements and repeatability between measurements.	D
Requirement 8.2.035	The vacuum housing and radiation shields of the cryostat shall be removable in separate parts, each part weighing equal or less than 50 kg.	I

	Rationale: To make sure that two operators can perform the action of exchanging samples from the sample chamber.	
Requirement 8.2.040	The vacuum housing and radiation shields of the cryostat shall be removable in the direction of the floor, and the housing design and the frame shall take this into account. Rationale: To make sure that two operators can perform the action to change the device under test from the sample chamber.	I
Requirement 8.2.045	The required tooling for the removing of the vacuum housing and radiation shields of the cryostat shall be included in the delivery. Rationale: We require a working system from this Tender.	I
Requirement 8.2.050	The cryostat shall contain heat switches to controllably create or break a strong thermal link between the 4K plate and the Still plate, and between the Still plate and the MXC plate. These heat switches shall not contain any moving parts. Rationale: To speed up thermalization of lower stages during pre-cooling to 4K, but to isolate them from each other during circulation mode. We want to avoid moving parts to ensure reliability and durability.	R
Requirement 8.2.055	The cryostat shall have a sample space available below the MXC of at least 55 litres. Rationale: Large space needed for many or highly complex samples.	R
Requirement 8.2.060	It shall be possible to add at least 2 additional temperature sensors and readout circuitry from the supplier in the future at the MXC stage. Rationale: These temperature sensors are additional to the 'standard' sensor that monitors the MXC plate temperature in order to allow temperature monitoring of multiple samples.	I
Requirement 8.2.065	The required wiring to connect the temperature sensors mentioned in Requirement 8.2.060 shall be pre-installed. Rationale: To have the additional temperature sensors working from delivery.	I
Requirement 8.2.070	The cryostat shall contain electronic heaters at the 4K, Still and MXC stages. Rationale: Helps to speed up warm-ups, necessary to optimize and measure cooling power.	I

8.2.1 Subject-matter Shields and Plates Requirements

Requirement	Description	Validation Method
Requirement 8.2.1.005	All plates that can reach a temperature of 4 K or lower shall be made of oxygen-free copper. Rationale: Required for high thermal conductivity.	R
Requirement 8.2.1.010	All plates and flanges that can reach a temperature of 4 K or lower shall be gold plated without a magnetic adhesion layer. Rationale: Gold plating improves copper's corrosion resistance / prevents oxidation while still having good and comparable thermal conductivity as copper.	R
Requirement 8.2.1.015	Each temperature stage (with exception of cold plate) shall be fitted in the cryostat vacuum can with a dedicated heat shield. Rationale: To protect the interior of the cryostat from external radiation, thus heating.	I
Requirement 8.2.1.020	The cryostat shall contain one or multiple heat shields between the still plate and the bottom of the experimental space. Rationale: To prevent radiation from the outside to reach the sample.	I

Requirement 8.2.1.025	At least one of the heat shields mentioned in requirement 8.2.1.020 shall be made of gold plated copper. Rationale: Gold-plated copper prevents Electromagnetic Interference.	R
Requirement 8.2.1.030	All plates that can reach a temperature of 4 K or lower shall contain a total area of at least 40 x 40 mm with a M3 or M4 threaded hole grid. P.S The total area can be split in multiple small areas on each stage. Rationale: To be able to mount samples.	I
Requirement 8.2.1.035	The supplier shall provide non-magnetic brass screws for mounting components. Rationale: Brass thermally contracts more than copper when cooling down, which provides better clamping force for connecting components to plates.	I

8.2.2 Subject-matter Inserts and Loaders Requirements

Requirement	Description	Validation Method
Requirement 8.2.2.005	The cryostat shall contain at least 2 detachable inserts. Rationale: We need 1 insert installed at all times and at least 1 insert stored outside of setup for preparation/testing.	I
Requirement 8.2.2.010	Each insert shall be able to contain at least 28 RF lines going from Room Temperature to the MXC stage. Rationale: We need to have 28 different RF lines in order to perform our experiments as described in the RF tab.	I
Requirement 8.2.2.015	Each insert shall contain plates/stages in the same location of the cryostat stages from the Room Temperature Stage to the MXC stage. Rationale: The RF lines in the inserts shall be thermalized and so the insert stages must be at the same height of the cryostat stages.	I
Requirement 8.2.2.020	Each RF line from each insert shall be thermalized at the plates/stages mentioned in requirement 8.2.2.015 by means of an attenuator (of 0 dB if no attenuation is desired). Optionally, for the 50K and 4K stages only, the RF lines can be clamped to the stage. Rationale: Minimize thermal noise by efficient cable cooling.	I
Requirement 8.2.2.025	Each insert stage mentioned in requirement 8.2.2.015 shall be made of the same material as the cryostat stage it can be attached to. Rationale: The stages in the insert should be thermalized to the temperature of the cryostat stages.	R
Requirement 8.2.2.030	The supplier shall provide radiation opaque plates with the dimensions of the ports, to be positioned at the 50K, 4K, Still and MXC stages when such ports are not in use. Rationale: Radiation tight plates to minimize radiation coming from the upper stages towards the samples when not all inserts are in use.	↓
Requirement 8.2.2.035	The system shall allow that inserts are loaded from the side of the cryostat. Rationale: Side loader makes it easily access for user to load the insert in and out of dilution cryostat. Top loader is not possible due to space in lab.	I

8.2.3 Subject-matter RF Requirements

Requirement	Description	Validation Method
Requirement 8.2.3.005	The cryostat shall contain at least 28 installed RF feedthroughs and RF lines between the room temperature (RT) and Mixing Chamber (MXC) flanges. Rationale: Suffices to operate an 8-superconducting-qubit device and for 10 spin qubit device which need 24 lines.	I
Requirement 8.2.3.010	The RF lines shall connect the feedthroughs at room temperature to the sample space.	I

	Rationale: Required for control of the samples with RF sources outside the cryostat.	
Requirement 8.2.3.015	The RF feedthroughs on the outside of the fridge shall be of the SMA type. Rationale: RF standard.	I
Requirement 8.2.3.020	The RF lines shall have a bandwidth of 12 GHz or more (defined as DC-12 GHz) and the attenuation of the bare lines shall not exceed 12 dB/m at any point of the fridge within this bandwidth. Rationale: Required for control of the sample with RF sources outside the cryostat.	R
Requirement 8.2.3.025	For all RF lines, the segments between RT and 4K stage shall be made of non-superconducting materials, such as stainless steel, CuNi and AgCuNi, for the inner and outer conductor. Rationale: Above 4K the temperature is too high to go for superconducting materials.	R
Requirement 8.2.3.030	For all RF lines, the segments between RT and 4K stage shall have a thermal conductivity of 1e-4 W.cm/K or lower. Rationale: To have as little heat as possible going from RT to 4K.	I
Requirement 8.2.3.035	For two of the RF lines (which we further refer to as output lines), the segments between 4K stage and final stage (CP or MXC) shall be made of NbTi or other superconducting material. Rationale: Minimizes losses in the output lines for better SNR.	I
Requirement 8.2.3.040	It shall be possible to replace any attenuator at the Still, CP and MXC stages by another attenuator of different attenuation. Rationale: Different experiments may require different levels of attenuation.	I
Requirement 8.2.3.045	Output lines shall contain no attenuators except 0dB attenuators. Rationale: To increase the SNR we want as little losses as possible.	I
Requirement 8.2.3.050	All RF lines shall contain the necessary bends to adjust for shrinkage during cooldown. Rationale: Needed to deal with thermal contraction.	I
Requirement 8.2.3.055	It shall be possible to mount at least 250 RF lines in the future. Rationale: Needed to operate a 75 SC qubit or 100 spin qubit device.	R
Requirement 8.2.3.060	The heat conductivity (in W/K) of each cable or cable ribbon shall be specified, at the relevant temperature (cable temperature when cryostat is cold). That includes the cables that we could install in the future to reach the full RF line capacity mentioned in Requirement 8.2.3.055. Rationale: To ensure that the operator can verify that the passive thermal load is sufficiently low	R
Requirement 8.2.3.065	The passive thermal load (no RF signal transmitted by the RF lines) of the cryostat with 250 RF lines shall not exceed 50% of the nominal (empty-cryostat) cooling power of each stage. Rationale: To ensure that nominal temperatures can be maintained with a fully wired cryostat.	A
Requirement 8.2.3.070	The RF Feedthroughs in the Cryostat shall have connectors specified to work within the RF line bandwidth (see Requirement 8.2.3.020) on the room and vacuum side. Rationale: The feedthroughs must be compatible with the RF lines.	R
Requirement 8.2.3.075	The RF lines shall allow the inclusion of a patch cable to convert the output connector to SMP or SMA at the sample space. Rationale: Different devices require either SMP or SMA connectors.	I
Requirement 8.2.3.080	The RF lines shall have connectors specified to work within the RF line bandwidth (see Requirement 8.2.3.015) on the MXC plate end. Rationale: To connect samples without mismatch of bandwidths.	R
Requirement 8.2.3.085	The RF lines shall have a characteristic impedance of 50 Ohm. Rationale: To avoid impedance mismatches with components outside the cryostat.	T
Requirement 8.2.3.090	The RF lines shall be able to handle an input RF power on the room temperature side of at least 33 dBm (2 W).	R

	Rationale: Required maximum time-average RF power at the sample.	
Requirement 8.2.3.095	The RF lines shall allow the attachment and detachment by the operator of components such as: • Cryogenic Attenuators • IR Filters • Low-noise (HEMT) amplifiers • Low-pass/bandpass filters • Circulators and Isolators • ... Rationale: Needed to control the RF signals reaching the sample while avoiding heat reaching the sample.	R

8.2.4 Subject-matter DC Requirements

Requirement	Description	Validation Method
Requirement 8.2.4.005	The Cryostat shall contain DC feedthrough and DC lines separated over 4 types: • HEMT power lines (requirements 8.2.4.035) • Switch lines (requirements 8.2.4.040) • Amplifier lines (requirements 8.2.4.045) • Voltage-bias resistive lines (requirements 8.2.4.050) Rationale: Required for cryo positioners, HEMTs, switches, experiment control.	I
Requirement 8.2.4.010	Each DC line shall be thermalized at each stage. Rationale: Required to avoid unnecessary heat reaching the sample space.	I
Requirement 8.2.4.015	The DC lines shall consist of segments between: • The room temperature and 4K stage • 4K stage and final (1K or below) stage Rationale: Required to debug and/or replace damaged lines.	R
Requirement 8.2.4.020	All DC lines in the cryostat shall come in the form of twisted wire pairs. Rationale: To avoid cross-coupling between wires and electrical pickup.	I
Requirement 8.2.4.025	DC lines shall be grouped in looms of 24 DC lines each in twisted pairs. Rationale: Allows use of standard Micro-D or D-sub connectors.	R
Requirement 8.2.4.030	It shall be possible to install at least 14 additional cable looms in the future. Rationale: We should be flexible to expand capacity.	I
Requirement 8.2.4.035	HEMT lines: The cryostat shall contain at least 30 HEMT power lines, which run between RT and 4K stage. These lines shall be made of copper and shall have a total resistance below 20 Ohms at room temperature. Rationale: To power HEMT amplifiers, without too much dissipation. 3 lines per HEMT, 10 HEMTs.	T
Requirement 8.2.4.040	Switch lines: The cryostat shall contain at least 4 separate looms with at least 16 lines each, going between the RT stage and the MXC stage. The lines shall be made of non-superconducting materials between the Room Temperature and the 4K stage and of superconducting materials between the 4K and the MXC. Rationale: Enough for 4 switches.	I
Requirement 8.2.4.045	Amplifier lines: The cryostat shall contain at least 12 experimental wire pairs (i.e. 24 lines), which run from RT to MXC stage. These lines shall be made of copper for the RT-4K section, and of superconducting materials between the 4K and the MXC. Rationale: Different experiments may require different levels of attenuation.	I
Requirement 8.2.4.050	Voltage bias-resistive lines: The cryostat shall contain at least 6 separate looms with 12 wire pairs (24 lines) each, going between the RT stage and the MXC stage. These wires shall be made of copper or phosphor-bronze. Rationale: To control up to 30 spin qubits	I

Requirement 8.2.4.055	DC looms shall have a 24 pin female Fischer connector at the room temperature side. Rationale: In order to be compatible with our wiring.	I
Requirement 8.2.4.060	DC looms shall be terminated by a Micro-D connector at the MXC stage, and, when applicable, at the 4K stage. Rationale: In order to be compatible with our wiring.	R

8.2.5 Subject-matter Magnet Requirements

Requirement	Description	Validation Method
Requirement 8.2.5.005	The cryostat shall be delivered with a solenoid magnet with a clear bore of 201 mm or larger. Rationale: To ensure that multiple samples fit simultaneously inside the magnet.	I
Requirement 8.2.5.010	The solenoid magnet shall have a length of at least 420 mm where samples or devices can be mounted. Rationale: For our experiments we aim at being able to measure at least two PCBs simultaneously.	R
Requirement 8.2.5.015	The solenoid magnet shall be able to create a magnetic field in the range of 0 to at least 1 Tesla in steps of 0.1 milliTesla. Rationale: Required to create magnetic fields at the place of the sample. Depending on the measurement we require a different magnitude.	T
Requirement 8.2.5.020	The solenoid magnet shall be equipped with switches for putting the magnetic coils in persistent mode. Rationale: Persistent mode allows for low energy consumption and stable operations.	D
Requirement 8.2.5.025	The solenoid magnet shall be monitored by at least one thermometer. Rationale: To ensure stable operation and keep track of the temperature preventing magnet quench.	I
Requirement 8.2.5.030	The solenoid magnet shall have a homogeneity of 1% or better over 10 mm diameter spherical volume in the Z direction. Rationale: To ensure an homogenous magnetic field over the samples.	D
Requirement 8.2.5.035	The solenoid magnet shall have a homogeneity of 1% or better over 10 mm diameter spherical volume in the X and Y direction. Rationale: To ensure an homogenous magnetic field over the samples.	D
Requirement 8.2.5.040	The system shall include a suitable power supply for the solenoid magnet. Rationale: To ensure a complete and working system.	I
Requirement 8.2.5.045	The solenoid magnet shall be removable from system. Rationale: Some experiments don't require a magnet.	I
Requirement 8.2.5.050	The tooling required to remove and insert the magnet in the system shall be included in the delivery of the system. Rationale: To make sure the operator can insert and remove the magnet.	I
Requirement 8.2.5.055	The solenoid magnet shall be equipped with a thermometer which is accurate below 10K. Rationale: Superconducting magnets operate at ~4K and we need to know its exact temperature before operating to prevent a magnet quench.	I
Requirement 8.2.5.060	The supplier shall provide the cable required to connect the solenoid magnet to the provided power supply. Rationale: To ensure that we can simply connect the power supply to the magnet without needing adapters.	I
Requirement 8.2.5.065	A vector magnet shall also be delivered with the system. Rationale: For several experiments it would be beneficial to change the direction of the magnetic field between experiments.	I

Requirement 8.2.5.070	The vector magnet shall have a clear bore of 100 mm or larger. Rationale: Sufficient space to include our samples.	I
Requirement 8.2.5.075	The vector magnet shall be able to create a magnetic field in the range of 0 to at least 1 Tesla in steps of 0.1 milliTesla or smaller in the X, Y and Z directions. Rationale: Required to create magnetic fields at the place of the sample. Depending on the measurement we require a different magnitude.	T
Requirement 8.2.5.080	The vector magnet shall be equipped with switches for putting the magnetic coils in persistent mode. Rationale: Persistent mode allows for low energy consumption and stable operations.	D
Requirement 8.2.5.085	The vector magnet shall have a homogeneity of 1% or better over 10 mm diameter spherical volume in the Z direction. Rationale: To ensure an homogenous magnetic field over the samples.	D
Requirement 8.2.5.090	The vector magnet shall have a homogeneity of 1% or better over 10 mm diameter spherical volume in the X and Y direction. Rationale: To ensure an homogenous magnetic field over the samples.	D
Requirement 8.2.5.095	The system shall include a suitable power supply for the vector magnet. If beneficial, The power supply can be the same for the two magnets. Rationale: To ensure a complete and working system.	I
Requirement 8.2.5.100	The vector magnet shall be removable from system. Rationale: Some experiments don't require a magnet.	I
Requirement 8.2.5.105	The vector magnet shall be monitored by at least one thermometer. Rationale: To ensure stable operation and keep track of the temperature preventing magnet quench.	I
Requirement 8.2.5.110	The vector magnet shall be equipped with a thermometer which is accurate below 10K. Rationale: Superconducting magnets operate at ~4K and we need to know its exact temperature before operating to prevent a magnet quench.	I
Requirement 8.2.5.115	The supplier shall provide the cables required to connect the vector magnet to the provided power supply. Rationale: To ensure that we can simply connect the power supply to the magnet without needing adapters.	I
Requirement 8.2.5.120	Magnitude of the magnetic fields generated by each magnet can be set manually, using the power supply unit's user interface or through software if available. Rationale: Need to adjust the parameters.	I
Requirement 8.2.5.125	The supplier shall provide a calibration curve showing how the magnetic field magnitude varies with the current provided to each magnet. Rationale: To understand how much current is given to the magnet to reach a certain magnetic field magnitude.	R
Requirement 8.2.5.130	The cryostat shall allow to switch between the solenoid and the vector magnet. Rationale: Different chips might require different magnets.	I

8.3 Subject-matter Cryostat Supporting Frame Requirements

Requirement	Description	Validation Method
Requirement 8.3.005	The supporting frame of the cryostat shall have a height equal to or below 2,70 m. Rationale: To be installed in a laboratory with a ceiling height of 3,08 m. 38 cm is a comfortable distance between the frame and the ceiling.	I
Requirement 8.3.010	The system shall not contain components above a height of 3,05 m. Rationale: To be installed in a laboratory with a ceiling height of 3,08 m.	I

Requirement 8.3.015	The assembly of the system shall not require more height than the available 3.08 m. Rationale: To be installed in a laboratory with a ceiling height of 3,08 m.	I
Requirement 8.3.020	The supporting frame of the cryostat shall have a maximum width of 2000 mm and a maximum length of 2000 mm. Rationale: The laboratory in which the system will be installed has limited space.	I
Requirement 8.3.025	The supporting frame of the cryostat shall ensure vibrations in the horizontal plane are below 200 um RMS between the cold plate and support frame. Rationale: To avoid detachment of cables from the samples.	I
Requirement 8.3.030	The supporting frame shall ensure that vibrations in the direction of the cryostat central axis (going from the top to the bottom of the cryostat) are below 200 um RMS between the cold plate and support frame. Rationale: To avoid detachment of cables from the samples.	I

8.4 Subject-matter Software and System Control Requirements

Requirement	Description	Validation Method
Requirement 8.4.005	A control unit shall be supplied together with the system. Rationale: Control of the system via a control unit is required for the acceptance test of the system and integration into the setup.	I
Requirement 8.4.010	The system shall be controllable and monitorable remotely via a software package. Rationale: After the cryostat system is integrated into the setup, we want to remotely control and monitor the setup using software.	I
Requirement 8.4.015	The software package shall be able to run on windows computers. Rationale: Our labs have windows computers so the software should run on one of them.	I
Requirement 8.4.020	The software package shall allow to turn off internet-enabled functionality, such as: (Automatic) updates - Forwarding of usage information Rationale: We need to be aware of, and have control over, any security-related behaviours of the devices we have in the lab.	I
Requirement 8.4.025	The software package (requirement 8.4.010) shall be able to control the following functionality: - Pumping down and venting the system - Open/close specific valves in vacuum system or He3/He4 mixture loop - Cooling down the sample to a temperature specified by the user down to the base temperature - Warm-up the system to ambient temperature. - Collect the He3/He4 mixture into the tank while keeping the system at 4K. - Power of any of the installed heaters. Rationale: After the cryostat system is integrated into the setup, we want to remotely control and monitor the setup using software. This is the minimal controllable system functionality.	D
Requirement 8.4.030	The software package (requirement 8.4.010) shall be able to show the following system parameters: - Vacuum pressure for all the installed vacuum gauges in the cryostat or gas handling system. - Temperature of each stage - Temperature of any additional pre-installed temperature sensor. - Temperature of the magnet - Magnetic field magnitude (based on a previously provided calibration curve requirement 8.2.5.070) - Temperature of cooling water (in/out) and oil (if included) of compressor	D

	Rationale: After the cryostat system is integrated into the setup, we want to remotely control and monitor the setup using software. This is the minimal monitored system functionality.	
Requirement 8.4.040	The software package shall display a graph with the evolution of the parameters defined in requirement 8.4.030 for the previous 3 months (with the possibility to adjust time scale to various times e.g. 30min, 1h, 5h etc.). Rationale: Would increase the user-friendliness for the operator when studying results from past experiments.	I
Requirement 8.4.045	The software package and interface shall allow the user to monitor the value of the parameters defined in requirement 8.3.030 with the minimum resolutions of (or better): - Temperature: 0.1 mK (sensor at MXC or sample) or 0.01 Kelvin (other stages) - Magnetic field: 0.1 mT. - Pressure: 1% of the minimal pressure of that sensor Rationale: Required for the operator to know the status of the system.	I
Requirement 8.4.050	The software package shall be able to store a log of measured parameters on a local file, accessible to other software. These log files shall have a commonly used data format such as .csv, .txt, .h5, .dat or similar. Rationale: Required to use external visualization tools such as Grafana to plot parameters.	D
Requirement 8.4.055	The software package and interface shall allow the user to set the values of the following parameters with the same resolutions as listed in Requirement 8.4.040: - Temperature at the MXC stage - Magnetic field magnitude. Rationale: Required for the Operator controlling the experiments.	D
Requirement 8.4.060	The control unit shall allow the user to be able to control the following functions: - Pumping down and venting the system - Cooling down the sample to a temperature specified by the user down to the base temperature - Warm-up the system to ambient temperature - Collect the He3 mixture into the tank while keeping the system at 4K. - Power of any of the installed heaters. Rationale: Required for the Operator for acceptance tests.	D
Requirement 8.4.065	System will be able to run automated scripts (e.g. given full cooldown or warmup) of functionalities listed in 8.4.025 which can be adjusted/programmed by the user. Rationale: Want to be able to make changes for certain thresholds or waiting times.	D

8.5 Subject-matter Gas Handling System Requirements

Requirement	Description	Validation Method
Requirement 8.5.005	The Gas handling system shall be able to report the pressure of the gases to the user. Rationale: For maintenance and safety.	I
Requirement 8.5.010	The system shall include the required gases for the operation of the system. Rationale: The system should work out of the box.	I
Requirement 8.5.015	It shall be possible to place the gas handling system at a distance of 2 meter or more from the cryostat. Rationale: The cryostat and the gas handling system shall be located in the same lab which has limited space. As an example, the hoses and cabling shall be at least 6 meters long	I
Requirement 8.5.020	The gas handling system shall be able to be filled by the operator. And instructions to do so shall be included in the delivery Rationale: This is required for continuous operation within TNO.	I
Requirement 8.5.025	The gas handling system shall include all tooling required to be operated (filled by the operator).	D

	Rationale: This is required for continuous operation within TNO.	
Requirement 8.5.030	The Gas Handling System shall require a maximum of 40 liters (at room temperature and ambient pressure) of He-3 to fulfil all the requirements stated in this document. Rationale: More He-3 required means that the system becomes more expensive.	D
Requirement 8.5.035	The system shall be equipped with safety valves which, in case of emergency, allow the 3He/4He mixture to be collected in the storage tank. Rationale: To avoid spillage of dangerous gases to the environment.	I
Requirement 8.5.040	In normal operation (cooldown/warmup), the 3He/4He mixture must never be conducted to the gas circuit parts responsible for managing other gases. Rationale: To avoid damage to the system.	I
Requirement 8.5.045	The Gas Handling System shall have a strategy to prevent the existence of contaminant gases in the helium. Rationale: We want to be able to remotely operate the setup.	I

8.6 Subject-matter Compressor Requirements

Requirement	Description	Validation Method
Requirement 8.6.005	The compressor shall be controlled remotely via a software package. Rationale: We want to be able to remotely operate the setup.	I
Requirement 8.6.010	The compressor shall be water cooled. Rationale: To prevent the heat load in the compressor room.	I
Requirement 8.6.015	It shall be possible to place the cryostat at a distance of 18 meters or more from the cryostat. Rationale: Compressors shall be in another room.	I
Requirement 8.6.020	The compressor shall have a minimal lifetime of 2 years of continuous operation. Rationale: This is the minimal lifetime we expect from the system as a whole.	D
Requirement 8.6.025	The compressors together shall fit on a floorspace of 2000 x 1000 mm. Rationale: To fit in the facility.	D

8.7 Subject-matter Facilities Requirements

Requirement	Description	Validation Method
Requirement 8.7.005	The electric power connections of the System shall have double poled fusing or circuit breakers (fuses placed in both the phase (s) and neutral conductors). Rationale: TNO safety standard.	I
Requirement 8.7.010	The electric power supplies for the system shall be of the types: 240 Volt, 1 phase, 50 Hz and / or 400 volt, 3 phase, 50 Hz. Rationale: The Cryostat shall comply with the building resource specifications.	I
Requirement 8.7.015	The system shall allow the location of the compressors in a separate room. Rationale: To limit noise, the compressors shall be separated from our experimental setup.	I
Requirement 8.7.020	The floor space occupied by the Cryostat added to the floor space occupied by the Gas Handling System shall fit within a 3500 x 3500 mm area. Rationale: Compressors shall be in another room.	I
Requirement 8.7.025	The shipping boxes including the equipment shall fit through a door of 1400 cm wide and 2200 cm height. Rationale: To be able to enter the facility.	I
Requirement 8.7.030	The unboxed equipment shall have a maximum size of 140 cm wide and 202 cm height. Rationale: To be able to enter the lab.	I
Requirement 8.7.035	The maximum power consumption of the entire system shall be below 34 kW. Rationale: The maximum power consumption allowed for the system is 35 kW. 1kW of leeway.	I

8.8 Subject matter 'General & Contractual aspects'

Requirement	Description	Validation Method
Requirement 8.8.005	Critical design review (CDR) The objective of the CDR is to confirm that the equipment and all deliverables satisfies the requirements. It establishes the compatibility of external & internal interfaces and the	R

Requirement	Description	Validation Method
	compliance of the design with contractual requirements (predicted and/or measured). The successful completion of the CDR permits the Supplier to start the manufacturing of the system. The CDR will contain the following details: - Physical dimensions of the system and system components. - External and internal interface location and dimensions of the system. - Showing the design meets the functional and performance requirements. The acceptance of the CDR shall be achieved using a written document, to be signed by both parties. In the event that the CDR fails to meet the requirements, the supplier or TNO must set out such failure in a written statement, to be signed by both parties. The supplier must then provide TNO with corrective action plan within fourteen (14) calendar days from the date of signing. The supplier must remedy these deficiencies at no additional cost within the timeframe set out in the corrective action plan, but not exceeding 1 month.	
Requirement 8.8.010	Site Acceptance Test (SAT) The SAT contains the following checkpoints: - The cryostat will be checked for damages; - The proper functioning of the equipment will be checked; - o Mechanical functions, - o Electrical safety- and switching functions, - o Gas safety and functions, - o Vacuum functionality, - o Cryogenic functionality, - o User interface(s), including software. - All requirements (such as requirements 8.2.010, 8.2.025, ...) and possible additional requirements will be checked; - The presence and quality of the documentation will be checked A full user acceptance test on-site of the contracted tenderer must be performed by the Tenderer in cooperation with TNO. Following approved user acceptance test on-site, the cryostat shall be at the unrestricted disposal of TNO for one month. If the cryostat works according to TNO's functional and technical specifications, without faults and/or malfunctions during operational mode, the test period is considered successfully concluded by TNO. If the cryostat is not operating in this period according to TNO's functional and technical specifications, the faults and/or malfunctions will be remedied and another test period of one month must successfully be concluded and approved by TNO, up to a maximum of three test periods of one month each. The details of the site acceptance test shall be agreed between the user and the supplier. Tenderer must submit a draft test protocol for the site acceptance test with its Tender. In the event that the deliverables fail to meet the user Acceptance Criteria for the SAT, the Supplier must set out such failures in a written statement, to be signed by both parties. The supplier must then provide TNO with a corrective action plan for such failures within fourteen (14) calendar days from the date of signing of such statement. The supplier must remedy these deficiencies at no additional cost within the timeframe set out in the corrective action plan, but not exceeding 3 months. A new acceptance test will then take place.	I
Requirement 8.8.015	Terms and conditions of payment - 20% at order, after receipt of a bank guarantee covering 40% of the total amount. - 20% after the critical design review (CDR) acceptance by TNO (Requirement 8.1.13.1). - 40% after delivery at location TNO Delft, STW At this moment TNO will return the bank guarantee. - 20% after installation and commissioning On-site and Site Acceptance Test (SAT) including test periods, approved by TNO, Management Quantum Technology and Procurement.	I

Requirement	Description	Validation Method
	The Tenderer to whom the Contract will be awarded must provide a bank guarantee to TNO, covering at least 30% of the total price. The Bank guarantee and the bank who issues the Bank guarantee have to be approved by TNO (minimal A rating). TNO must have the right to draw the bank guarantee in any and all cases where Tenderer falls short in fulfilling its obligations under the Contract. The validity of the bank guarantee may not expire until approval of the SAT by TNO Management and Procurement. Alternatively to a bank guarantee, TNO also accepts a Parent Company Guarantee, in which the parent company agrees to the repayment of the progress payment in the event that tenderer, or wholly owned subsidiary, defaults on the supply of an cryostat, which is the subject of this order.	
Requirement 8.8.020	When supplying the cryostat, the Tenderer shall provide a Mill Test Certificate (MTC), or similar certificate such that it meets the requirements and obligations to establish the country of origin (further specified in paragraph 5.2.4)	I
Requirement 8.8.025	Maintenance/services Contract, further specified in paragraph 1.7	I
Requirement 8.8.030	The tenderer must have comprehensive maintenance facilities within Europe. These facilities should be equipped to handle all aspects of maintenance, including diagnostics, repairs, and parts replacement. The facilities must be strategically located to ensure quick and efficient service delivery	
Requirement 8.8.035	User manual with detailed description of the hardware and software, including any custom made options. Rationale: To provide clear understanding of the system's functionalities, facilitate effective utilization and help with the troubleshooting of the instrument.	I
Requirement 8.8.040	The Contract will be executed through a purchase order, incorporating the Purchasing Conditions for Goods TNO 2022 and Incoterms 2020 Delivered Duty Paid (DDP). Tenderers should be aware that the tender will become a contractual document if the contract is awarded to the Tenderer.	I

8.9 Programme of Preferences

8.9.1 Preference QY1: Extra Cooling Power

Preference QY 1 Max. 150 points	As stated in requirement 8.2.010 the minimum cooling power at 100 mK is specified as 400 uW. For expanding the number of experiments in the future, we would like to have more cooling power at 100 mK. Specify the cooling power at 100 mK as measured on the cold plate.
	The complete answer for Preference QY1 must not exceed a maximum of 1 (one) A4 page. If the answer is longer than 1 page, the excess pages will not be included in the assessment.
Assessment criteria:	Every additional 20 uW of cooling power above 400 uW will give 5 extra points up to a maximum of 150 points.

8.9.2 Preference QY2: Extras Vector Magnet

Preference QY 2 Max. 100 points	To start immediately performing more complex experiments, the Cryostat shall be delivered with a vector magnet as described in requirement 8.2.5.065 in addition to the solenoid magnet already required as defined in section 8.2.5. As mentioned in section 8.2.5 there are a set of requirements that the vector magnet must comply with. Besides the requirements, we also have a set of additional qualities that would lead to better experiments. - To allow multiple devices being tested simultaneous, specify how larger than the required 100 mm (Requirement 8.2.5.070) can the bore of the vector magnet be. - For devices requiring a higher magnetic field, specify how higher than the required 1 Tesla in X, Y and Z (Requirement 8.2.5.075) can the maximum magnetic field generated be. For the score of this quality to be higher than 0 points, the eventual additional cost from the better magnet specifications must still make the cost of the entire system to be below the price ceiling of € 1.000.000,-- (excluding VAT) as specified in section 6.1.1.
	The complete answer for Preference QY2 must not exceed a maximum of 4 (four) A4 pages. If the answer is longer than 4 pages, the excess pages will not be included in the assessment. Also, the Tenderer should submit its answer <u>to each bullet point (!) and in the same order ("from top to bottom") of the bullet points under this preference.</u>
Assessment criteria:	Every additional 1 mm of clear bore above 100 mm will give 1 extra point, and every additional 0.1 Tesla about 1 Tesla will give 5 points.

8.9.3 Preference QY3: Interchangeability Magnets

Preference QY 3 Max. 50 points	We expect that for future users of the cryostat it would be beneficial if we can provide the option of applying a magnetic field in multiple directions (besides z, also in x and y), hence we requested both a solenoid and a vector magnet (Section 8.2.5).
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	Specify how would a user change between the use-cases solenoid magnet, vector magnet and NO magnet. Please consider aspects such as, reusing the components (power supply, cables...) which are in place for the solenoid magnet or easiness of exchange in your answer.
	The complete answer for Preference QY3 must not exceed a maximum of 4 (four) A4 pages. If the answer is longer than 4 pages, the excess pages will not be included in the assessment. Also, the Tenderer should submit its answer <u>to each bullet point (!) and in the same order ("from top to bottom") of the bullet points under this preference.</u>
Assessment criteria:	The assessment of this sub-sub-criterion involves considering the extent to which the response is specific, realistic, achievable, effective, complete and consistent. To what extent does the answer align with TNO's situation, the stated preference/question and the PoR. The assessment will be based on the overall impression created by the answers given. The aspects "specific, realistic, achievable, effective, complete and consistent" are not sub-sub-award criteria that are assessed individually. This sub-sub-criterion is rated in absolute terms in accordance with the table as included in Section 6.1.2 with a score between 0% (no/poor answer) and 100% (very good answer).

8.9.4 Preference QY4: Interface and Control

Preference QY 4 Max. 100 points	The system should allow easy integration into our experimental setup and software framework, including remote control and readout of relevant system operations (such as temperature, pressure, etc.). Describe the control API, the features of the work panel and other features related to the control of the system, including (continuous) availability of drivers for different operating systems and automated scripts for operation of the system. Some of our preferences: ➤ A properly documented protocol for monitoring and control is strongly preferred over access exclusively via programming-language specific API support that ultimately depends on binary components, such as DLLs for Windows or shared object (.so) files for Linux. Rationale: Such binary drivers are often tied to specific versions of the OS, and introduce undesirable dependencies in the software, and may render the device useless in the future if the OS makes an ABI-breaking change and the device vendor does not update their drivers. ➤ A hardware interface based on Ethernet using TCP/IP is preferred over alternatives (e.g. Ethernet/UDP, Ethernet/Custom, USB-based interfaces using USBTMC or serial-over-USB). Rationale: Ethernet provides more flexibility with respect to the physical placement of the device relative to the controlling PC, and is generally a more robust interface compared to USB. TCP provides flexibility to monitor and control device traffic. An automated and robust operation of the system is important for our experiments. Describe how the system ensures automated and robust operation. Include in your answer at least the following: - Does the cryostat rely on a local PC for operation? - Is the cryostat unaffected by a crash of any PC connected to it? - Is the valve of the bypass of the compressor closed automatically after condensation?
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	- Is the system able to run automated scripts (e.g. given full cooldown or warmup) of functionalities listed in Requirement 8.4.025 which can be adjusted/programmed by the user. Does the cryostat store a user-accessible log of the received commands and errors it encountered?
	The complete answer for Preference QY4 must not exceed a maximum of two (2) A4 pages. If the answer is longer than 2 pages, the excess pages will not be included in the assessment. Also, the Tenderer should submit its answer <u>to each bullet point (!) and in the same order ("from top to bottom") of the bullet points under this preference.</u>
Assessment criteria:	The assessment of this sub-sub-criterion involves considering the extent to which the response is specific, realistic, achievable, effective, complete and consistent. To what extent does the answer align with TNO's situation, the stated preference/question and the PoR. The assessment will be based on the overall impression created by the answers given. The aspects "specific, realistic, achievable, effective, complete and consistent" are not sub-sub-award criteria that are assessed individually. This sub-sub-criterion is rated in absolute terms in accordance with the table as included in Section 6.1.2 with a score between 0% (no/poor answer) and 100% (very good answer).

8.9.5 Preference QY5: Additional RF/DC components

Preference QY 5 Max. 150 points	To control the samples, several operations must be performed to the signals passing through the RF and DC lines. For thermal control reasons it is beneficial that some of these operations are performed inside the cryostat. As stated in requirement 8.2.3.100, the RF trains shall be compatible with the addition of several RF control components. It would be beneficial if the cryostat is delivered already with these components in a configuration that we would define during the Critical Design Review (CDR). The components to be discussed during the CDR are the following: • Multiple attenuator options in the range [0;20] dB • HEMT amplifiers • IR Filters • Circulators and Isolators • Low-pass and bandpass frequency filters Examples of configurations we would request during the CDR: • Two Output lines with low-noise (HEMT) amplifiers – 4/12 GHz bandwidth, minimum gain of 30 dB and maximum noise temperature of 5K - at the 4K stage, with low-noise circulators or isolators between the 4K and the MXC. • Two amplifier pump lines with the following pre-installed attenuators ○ 20 dB at the 4K and 10 dB at the Cold Plate. • Eight flux lines with the following pre-installed attenuators ○ 20 dB at the 4K. • Sixteen Drive lines with the following pre-installed attenuators ○ 10 dB at 4K, 10 dB at the Still Stage, 0dB at the Cold Plate and 3 dB at the MXC stage. • IR Filters installed at the MXC for all RF lines except the output lines • The system may be equipped with a pre-installed microwave readout module consisting of a double-junction isolator/circulator, directional coupler and a DC block. • The DC voltage-bias resistive lines may have RC filters. • All DC lines may have low-pass filters at the MXC stage. Could you please explain if the requests above could be included in the system delivered by the tenderer?
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	Please include at least the following items in your answer: - Specify if the components described above can be delivered with the system delivered. - Specify if during the CDR the tenderer is open to mount the components in a configuration defined by TNO (as the examples above). - Specify if the tenderer can provide the system with the example configurations mentioned above implemented. If not all of them, which can be provided?
	The complete answer for Preference QY 5 must not exceed a maximum of three (3) A4 pages. If the answer is longer than 2 pages, the excess pages will not be included in the assessment. Also, the Tenderer should submit its answer <u>to each bullet point (!) and in the same order ("from top to bottom") of the bullet points under this preference.</u>
Assessment criteria:	The assessment of this sub-sub-criterion involves considering the extent to which the response is specific, realistic, achievable, effective, complete and consistent. To what extent does the answer align with TNO's situation, the stated preference/question and the PoR. The assessment will be based on the overall impression created by the answers given. The aspects "specific, realistic, achievable, effective, complete and consistent" are not sub-sub-award criteria that are assessed individually. This sub-sub-criterion is rated in absolute terms in accordance with the table as included in Section 6.1.2 with a score between 0% (no/poor answer) and 100% (very good answer).

8.9.6 Preference QY6: Loader and Storage for Inserts

Preference QY 6 Max. 100 points	As stated in section 8.2.2, for our experiments we must have detachable inserts In section 8.2.2 For our use-case we would like to easily exchange between inserts, prepare inserts outside the cryostat and safely store inserts when not in use. Do you have procedures/equipment in place to facilitate these topics? If so, please describe them. Please include at least the following items in your answer - Is storage provided for the inserts when not in use? - Is a loader provided to facilitate integrating the inserts in the cryostat? - Is there a holder for the inserts for the operator to exchange wires and samples with the insert outside the cryostat?
	The complete answer for Preference QY 6 must not exceed a maximum of two (2) A4 pages. If the answer is longer than 2 pages, the excess pages will not be included in the assessment. Also, the Tenderer should submit its answer <u>to each bullet point (!) and in the same order ("from top to bottom") of the bullet points under this preference.</u>
Assessment criteria:	The assessment of this sub-sub-criterion involves considering the extent to which the response is specific, realistic, achievable, effective, complete and consistent. To what extent does the answer align with TNO's situation, the stated preference/question and the PoR. The assessment will be based on the overall impression created by the answers given. The aspects "specific, realistic, achievable, effective, complete and consistent" are not sub-sub-award criteria that are assessed individually. This sub-sub-criterion is rated in absolute terms in accordance with the table as included in Section 6.1.2 with a score between 0% (no/poor answer) and 100% (very good answer).

8.9.7 Preference QY7: Maintenance and Support

Preference QY 7 Max. 150 points	As broken parts can cause downtime of the system, it is important that a good support infrastructure is present. Include in your answer the following points: - How is preventive maintenance of the cryostat organized? - How is the repair or replacement of broken components organized? - What is the normal interval between maintenances? Indicate the typical timeframe (from failure to restart of the experiments) for replacing a critical component in the system including: ➤ A broken part in general ➤ Compressor parts ➤ Cryostat parts (e.g. the pulse tube) ➤ A broken pump ➤ A broken turbo ➤ A broken magnet Describe the required preventive maintenance and schedule of the cold parts, the vacuum system, and the electronics. What is the lifetime of the compressor? This should meet minimally requirement 8.6.020.
	The complete answer for Preference QY 7 must not exceed a maximum of three (3) A4 pages. If the answer is longer than 3 pages, the excess pages will not be included in the assessment. Also, the Tenderer should submit its answer <u>to each bullet point (!) and in the same order ("from top to bottom") of the bullet points under this preference</u>
Assessment criteria:	The assessment of this sub-sub-criterion involves considering the extent to which the response is specific, realistic, achievable, effective, complete and consistent. To what extent does the answer align with TNO's situation, the stated preference/question and the PoR. The assessment will be based on the overall impression created by the answers given. The aspects "specific, realistic, achievable, effective, complete and consistent" are not sub-sub-award criteria that are assessed individually. This sub-sub-criterion is rated in absolute terms in accordance with the table as included in Section 6.1.2 with a score between 0% (no/poor answer) and 100% (very good answer).

9 List of Annexes

All the Annexes appended to the Procurement Documents are published with the Procurement Guide at www.TenderNed.nl.

The Annexes are divided into three (3) main groups, namely:

A) Submission of Tender:

- Annex A01** The Tenderer's ESPD, "European Single Procurement Document" (ESPD)
 - *If applicable, this format should be multiplied in proportion to the number individual Combination members; the individual Third Party or for the benefit of one or more subcontractors to be used for the work).*
- Annex A02** Format for Reference Projects
- Annex A03** Format for Price Sheet
- Annex A04** Answer to questions/compliance with preferences, sub-award criterion: Quality
- Annex A05** Maintenance/Services' (own format).

B) Submission of supporting documents:

- Annex B01** Format for Declaration as to Reliance on Financial and Economic Standing of Third Party or Parties
- Annex B02** Format for Declaration as to Reliance on Technical and Professional Competence of Third Party or Parties
- Annex B03** Format for Statement of Policy/Declaration as to Insurance

C) Additional information:

- Annex C01** Standard Template for Tenderer Questions
- Annex C02** Draft Contract
- Annex C03** TNO's Conditions of Purchase for Goods , February 2022

Additional note on Section 2.2.2 Formats

Some of these Annexes are accessible in "editable" MS Excel or MS Word versions. This is with the aim of simplifying the preparation of a Tender by the Tenderer and therefore also forms the basis for the assessment procedure as described in Section 3.

Some documents may be, partially, secured to prevent inadvertent and unintentional changes being made to the documents and texts (including format texts).

Changes to the formats are not permitted. The premise for these documents is that the text (including format text) as contained in the Procurement Guide and published on www.TenderNed.nl will be the authoritative text at all times.