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# Introduction

## Purpose

This Requirements Specification Document (RSD) lists the technical requirements and constraints for the selection of a deionized water generating system. This can lead to the identification of product interfaces with the ELI Beamlines science based technology and ELI Beamlines building facility. This RSD also acts as the parent document for the technical requirements that need to be addressed in lower level design description documents.

## Scope

This RSD contains all of the technical requirements: functional, performance and design, transportation and installation, safety and quality requirements for the following product (tender number: TP16\_182): **Deionized water generating system** (further “**System**”).

The System is considered to be the standalone technology and is registered in the PBS software under the following PBS code: *CC.1.42*.

This System is a **product Category B** according to the ELI Beamlines RSD categories. Category B is an Off-the-shelf Product with customization (e.g., product performance) that does not require any design modifications of the product. All verification activities performing by a supplier shall be executed in accordance with the supplier’s plan of outgoing inspection and tests. The verification of all specified parameters listed in this RSD will be undertaken by the Supplier before delivery to the ELI Beamlines facility and the System shall be furnished with a verification protocol and a declaration of conformity, to reflect their proper characteristics. Furthermore, the System will be subject to testing and verification upon delivery to the ELI Beamlines facility. All nonconformities (if any) must be addressed by the supplier in a timely manner.

## Terms, Definitions and Abbreviations

For the purpose of this document, the following abbreviations apply:

| **Abbreviation** | **Meaning** |
| --- | --- |
| CA | Contracting Authority (Institute of Physics AV CR, v. v. i.) |
| ELI | Extreme Light Infrastructure |
| RSD | Requirements Specification Document |
| TOC | Total Organic Carbon |

## Reference documents

|  |  |
| --- | --- |
| **Number of document** | **Title of Document/ File** |
| *RD-01* | *00163567-B\_1.2\_Q\_M\_Guide\_for\_Instructions\_for\_Use\_Ver-9\_EN\_fully\_signed.pdf* |

## References to standards

If this document includes references to standards or standardized/ standardizing technical documents the CA allows/permits also another equal solution to be offered. If a supplier offers another equal solution the CA shall not reject its bid, once the supplier by appropriate means in the bid proves that the offered supplies, services or works meet in an equivalent manner the requirements including references to standards or technical documents.

# Functional and Performance requirements

## General requirements

REQ-023196/A

Deionized water at the output of the System shall have minimal resistivity of 17 MOhm/cm.

REQ-023286/A

The System shall have the TOC content value of the deionized water at the output smaller than 10 ppb.

REQ-023197/A

The System shall include particle filtration sub-system to filter particles larger than 200 nm.

REQ-023287/A

The System shall include feature to filter potential particular contamination from the pump with 100 nm particle filter at the output pump (if present in the System).

REQ-023288/A

Deionized water at the output of the System shall be controllable and output pressure of the System shall reach at least 1 bar or more at its maximum.

REQ-023198/A

The System shall enable continuous supply of ultra-clean water with the above specified requirements (see REQ-023196/A, REQ-023286/A, REQ-023197/A, REQ-023287/A and REQ-023288/A) at least 300 l/hour.

REQ-023199/A

The System shall include the following components:

* Continuous recirculation loop;
* At least 300 l reservoir with accessories enabling automated operation;
* Digital water conductivity meter allowing conductivity measurements of required conductivity and with platinum electrode;
* Automated water softener;
* Filtration section of the System shall allow automated filtration with activated carbon and sand filter;
* Reverse osmosis unit with electro-deionization.

REQ-023200/A

The Continuous recirculation loop of the System shall include the following components:

* Subsystem for deactivation of organic compounds with UV light (sterilization with at least 50 W of power);
* Additional ionex filter.

REQ-023201/A

The System shall fit in a bounding box of dimensions 2500 x 1000 x 2400 mm3 (width, depth, height) or less.

REQ-023289/A

The System shall be delivered with consumables and spare parts (e.g. filters) allowing regular maintenance for a period of two years.

REQ-023290/A

Consumables and spare parts of the System shall be available off-the-shelf on the market for a period of up to 5 years.

# Transportation an Installation requirements

REQ-023202/A

The transportation to the final destination at the ELI Beamlines premises, the installation and final verification of the System shall be conducted by the Supplier.

*NOTE: The bid price will be considered by the CA as the final price, including both transportation and installation costs.*

REQ-023203/A

The System and its components shall be delivered in protective package preventing damage and contamination. The System and its components shall be cleaned and packaged in compliance with the cleanliness of class 7 according to ČSN EN ISO 14644 (equivalent to EN ISO 14644) or cleaner.

*NOTE: If the Supplier cannot fulfill class 7 cleanliness requirements, the Supplier and the CA shall agree on the cleaning method to be used to clean devices without decreasing the devices' performance and to avoid contamination of the clean space of the CA.*

REQ-023204/A

The transportation and Installation procedures shall be discussed and can be reviewed by the CA’s installation officer.

REQ-023205/A

The Supplier shall allow the CA to supervise the activities related to the transportation and installation.

*NOTE: Any acts of supervision shall not mean that the CA assumes additional liability of any kind exceeding its liabilities according to the contract.*

REQ-023206/A

All participants to the installations shall undertake a lecture by the CA regarding safety, cleanliness, protection of the environment and working methods before starting their activities on the premises. The content of the lecture shall be adequate to the working area and the work activities expected.

# Safety Requirements

REQ-023208/A

The Supplier shall supply a Declaration of Conformity or any other equivalent document legally recognized and accepted in the Czech Republic for each product type if the appropriate legislation determines the Supplier's obligation to have a Declaration of Conformity (or the equivalent document) for the purposes of a Product sale in the Czech Republic to fulfil the requirements of 2001/95/EC directive or applicable Czech law.

# Quality Requirements

## General Quality Requirements

REQ-023209/A

The Supplier shall provide Instructions for use (Product User Manual) as part of the delivered Product. The Instructions for use shall be written in accordance with ČSN EN 82079-1 (equivalent to EN 82079-1) and shall include the instructions and descriptions regarding the following:

* transport and handling;
* storage, installation and cleaning;
* safe operation, maintenance and disassembly procedures.

*NOTE: As an alternative to standard ČSN EN 82079-1 (equivalent to EN 82079-1) an internal ELI guide can be used by the Supplier (see* ***RD-01****; chapter 1.4) which will be provided by the CA upon request.*

REQ-023210/A

The Supplier shall provide information on execution of outgoing check of the Product. At least this information shall comprise declaration about execution of outgoing check and declaration of conformity with technical requirements defined by the product RSD and completeness of the Product.

REQ-023211/A

The Supplier shall establish and maintain a nonconformity control system compatible with ČSN EN ISO 9001 (equivalent to EN ISO 9001).

## Specific Quality requirements

REQ-023253/A

The Supplier shall provide basic training at ELI Beamlines premises on how to operate and maintain the System. This training shall take place after the successful installation and final verification of the Product.

REQ-023254/A

In case of a warranty repair of the System by the Supplier, the Supplier shall redo necessary parts of the verification procedure. The results of this process shall be provided to the CA.

## Acceptance

Acceptance will be carried out by the CA upon installation and final verification of the System at ELI Beamlines premises.

The Acceptance phase shall demonstrate following:

* Final installed System has been successfully verified and this process has been documented in an appropriate way (see REQ-023256/A);
* All detected nonconformities have been solved in accordance with
REQ-023211/A;
* Final System is free of fabrication errors and is ready for the intended operational use.

In case of successful acceptance phase the CA will provide to the Supplier signed acceptance protocol. In case of unsuccessful acceptance stage the CA will provide to the Supplier Nonconformity Report (NCR) and process in accordance with
REQ-023211/A will be applied.

REQ-023255/A

Acceptance shall be complete when the System complies with all specifications verified by the Supplier’s outgoing check (see REQ-023210/A) and after successful passing acceptance tests including functional demonstration.

*NOTE 1: Supplier’s outgoing check shall be carried out prior to delivery.*

*NOTE 2: The final verification shall be carried out by the Supplier after the System installation at ELI Beamlines premises within 4* *weeks upon the issuing of the Handover/takeover protocol.*

REQ-023256/A

The results of final verification process (see REQ-023255/A) shall be documented by the Supplier in the test report that is to be approved by the CA before acceptance.