



**UiT The Arctic
University of Norway**

**PART 2 - APPENDIX 1 - BUYER'S REQUIREMENT
SPECIFICATION
FOR THE PROCUREMENT OF**

Water treatment unit to the Department of Comparative Medicine (AKM)

ANSK-0069-25

1.1 The scope and content of the procurement

1.1.1. Background

The Department of Comparative Medicine (AKM) at the Faculty of Health Sciences at UiT is a core facility that plays a central role in biomedical research using laboratory animals such as mice, rats, pigs and zebrafish.

The department is undertaking the construction of a dedicated zebrafish facility to support research using both zebrafish and medaka as model fish. AKM is currently used by research groups working in areas including cancer, neuroscience, cardiovascular disease, infectious disease, metabolic disorders and autoimmune conditions. The department also collaborates with the University Hospital of North Norway and has capacity to support other research institutions and biotechnology companies in the region.

1.1.2 Purpose and scope of the procurement

The Department of Comparative Medicine invites tenders for the delivery, installation, commissioning and handover of a wastewater disinfection system for the treatment of effluent from the animal research facility. The scope of the procurement includes wastewater from zebrafish and medaka housing systems, associated laboratories, and wash cycles for tanks and related equipment.

The system must be designed, installed and documented to meet all applicable Norwegian legislation, regulations and guidance, and must enable the department to obtain any required approvals from the Norwegian Food Safety Authority (Mattilsynet), the Norwegian Veterinary Institute (Veterinærinstituttet) and the Norwegian Directorate of Health (Helsedirektoratet).

The supplier shall offer a complete solution covering all aspects of the procurement to allow for a fully operational water disinfection unit.

1.1.3 Suppliers' role in facility approval

For applications concerning the approval of disinfection systems, a two-stage approval process shall apply. Initially, the submitted application and supporting documentation will be reviewed. Where the proposed technical solution is considered to meet the applicable requirements in principle, and where no significant gaps, omissions or obvious deficiencies have been identified, a provisional approval may be issued. The purpose of the provisional approval is to provide assurance to both the supplier and the end user, prior to assembly and installation, that the proposed technical solution is theoretically compliant with the relevant requirements and has been adequately considered and documented. A provisional approval does not constitute a guarantee that the completed installation will receive final approval. Final approval will only be granted following commissioning and a comprehensive functional performance test of the installed system, demonstrating compliance with all applicable requirements.

The supplier shall therefore provide all required documentation, validation testing and certifications, and shall actively support AKM in obtaining the necessary regulatory approvals for the wastewater disinfection unit. This support shall include, but not be limited to, preparing and submitting application documentation and supporting evidence, providing validation tests and test plans, test reports and relevant certificates, responding promptly to requests for additional information, participating in meetings, site visits, inspections and commissioning activities with the relevant approving authorities, and implementing corrective actions or supplementary testing if required.

During commissioning/inspection, the plant shall be operated at maximum hydraulic capacity, and all technical and process functions shall be checked, including, but not limited to, pumps, valves, filters, level sensors, dosing equipment, control and alarm functions, measuring instruments, cleaning and/or sludge removal equipment etc.

For specific legislative and guidance references, see Attachments 1–5 and the URLs listed below.

Attachment 1 - Veileder NVI godkjente metoder

<https://www.vetinst.no/fagomrader/desinfeksjon/veileder-metoder-godkjent-for-desinfeksjon-av-vann-til-fra-akvakulturrelatert-virksomhet> (With primary focus on — without being limited to Section 4)

Attachment 2 - Forskrift om desinfeksjon av inntaksvann til og avløpsvann fra akvakulturrelatert virksomhet, FOR-197-02-20-192

<https://lovdata.no/dokument/SF/forskrift/1997-02-20-192>

Attachment 3 - Akvabiosikkerhetsforskriften, FOR-2022-04-05-624

<https://lovdata.no/dokument/SF/forskrift/2022-04-05-624> (, With primary focus on — without being limited to Artikkel 9, DEL 3, sec. 3i)

Attachment 4 - Forskrift om innesluttet bruk av genmodifiserte dyr, FOR-2001-12-21-1602

<https://lovdata.no/dokument/SF/forskrift/2001-12-21-1602> (With primary focus on — without being limited to Vedlegg 1, spesifikke inneslutningstiltak for akvatiske dyr.)

Attachment 5 - Veileder - Hvordan krav nedfelt i vannbehandlingsforskriften kan oppfylles,

[Veileder - Hvordan krav nedfelt i vannbehandlingsforskriften kan oppfylles - Veterinærinstituttet](#)

1.2 Technical information and requirements regarding the procurement

1.2.1 General information

The water disinfection unit shall be either a chlorine based chemical system or a thermal (heat) treatment system. Regardless of the chosen technology, the system must fully comply with all applicable Norwegian legislation, regulations, guidance and relevant standards in force, including the requirements set out in Appendix 1A (this document) and 1B (Requirements table).

The following Norwegian regulations and standards are particularly relevant to machinery, electrical equipment, electrical installations and installation work in Norway, where applicable:

- Norwegian Regulations on Machinery, Regulations No. 544 of 20 May 2009 (official text in Norwegian only)
- Norwegian Regulations on Electrical Equipment, Regulations No. 1598 of 10 October 2017 (official text in Norwegian only)
- Norwegian Regulations on Electromagnetic Compatibility, Regulations No. 1597 of 10 October 2017 (official text in Norwegian only)
- Norwegian Regulations on Electrical Low-Voltage Installations, FEL, Regulations No. 1062 of 6 November 1998 (official text in Norwegian only; applicable to the interface with the building's fixed electrical installation)

- Norwegian Regulations on Electrical Enterprises and Qualification Requirements, FEK, Regulations No. 1133 of 19 June 2013 (official text in Norwegian only; applicable where work is performed on the building's fixed electrical installation)
- NEK 400:2026, Electrical low-voltage installations (available in Norwegian only; applicable to the interface with, connection to, and any work forming part of the building's fixed electrical installation)
- NEK EN 60204-1:2018+A1:2025, Safety of machinery – Electrical equipment of machines – Part 1: General requirements (available in English)
- NEK EN IEC 61439-1:2021 and NEK EN IEC 61439-2:2021, Low-voltage switchgear and controlgear assemblies (available in English)

1.2.2 Information about water capacity and water quality

The influent wastewater is expected to have a pH ranging between 6.0–9.0, conductivity of 500–1500 $\mu\text{S}/\text{cm}$ and a temperature ranging from approximately 15–45°C. The wastewater will contain typical zebrafish by-products. Sources feeding the treatment unit include wastewater from the zebrafish housing systems (including an infection unit handling biological agents up to biosafety level 2, per the regulations concerning [Action and Limit values, Chapter 6 — Lovdata](#)) and routine drains from dry laboratories. The waste stream does not contain human faecal matter.

Water volumes were estimated from facility capacity, rack counts, sinks and dishwashers (see Figure 1 and Table 1). Estimated daily wastewater from the zebrafish facility is approximately 950 L/day; the disinfection system must be designed to accommodate a flow of 1,000 L/day. **The supplier shall design the disinfection system to ensure continuous operation of the zebrafish facility for a minimum of 72 hours (3 days) in the event of a primary-system failure, at an expected daily flow of (1,000 L/day).** The contingency solution may include redundant treatment units, a standby disinfection unit, on site storage, sufficient reserve consumables or other solutions. See Appendix 1B for further details.

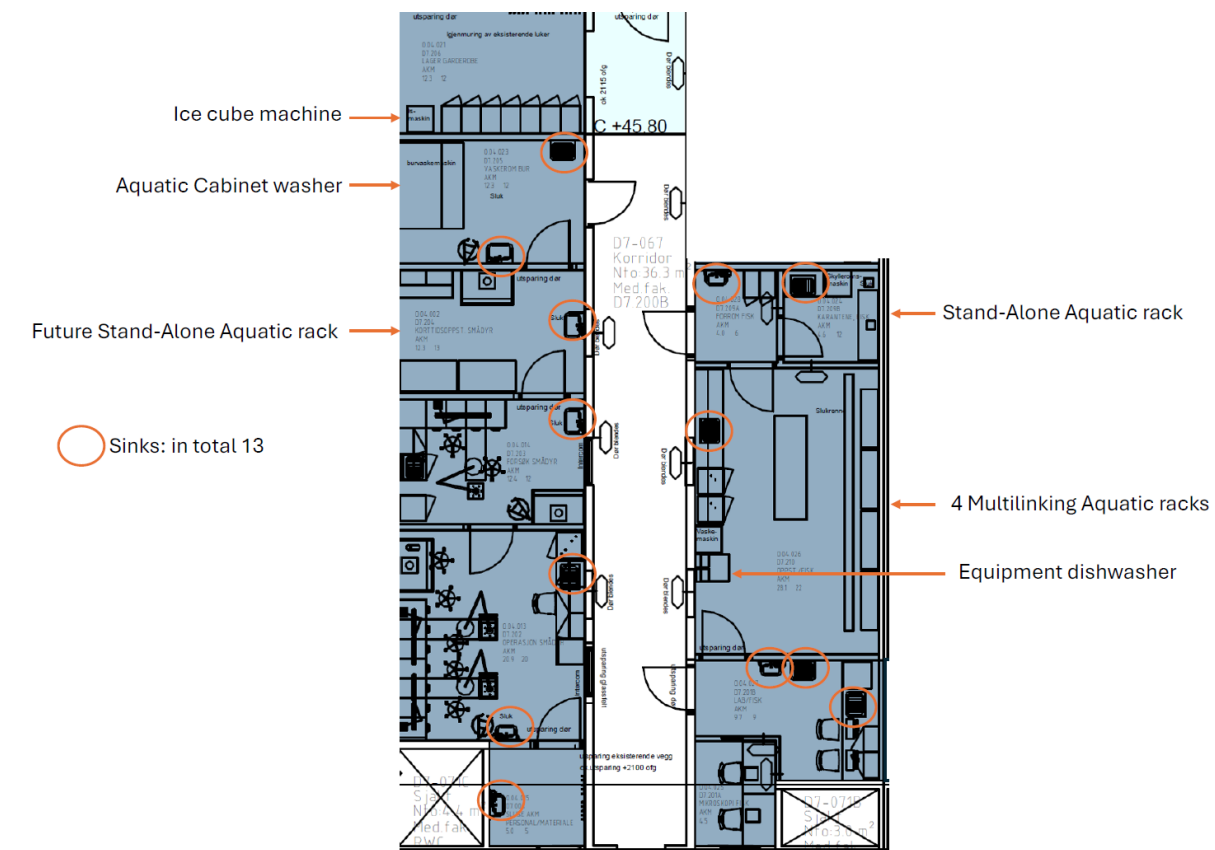


Figure 1

	Number	L/24hr	total l/24hr
Racks	6	50	300
Cabinet washer (nr. of cycles)	3	160	480
Dishwasher (nr. of cycles)	2	15	30
Sink / drain	14	10	140
Sum			950

Table 1 - water volume pr. 24 hours

1.2.3 Technical information about the building

Access to the building requires transport vehicles to pass beneath two bridges with a height of 3.8 m. Suppliers shall ensure that the proposed equipment can be delivered to the site within this height restriction.

1.2.3.1 Available space for disinfection facility

Room D6.003 is available for placement of the wastewater disinfection equipment. See also DWG-drawing and Figure 2 below.

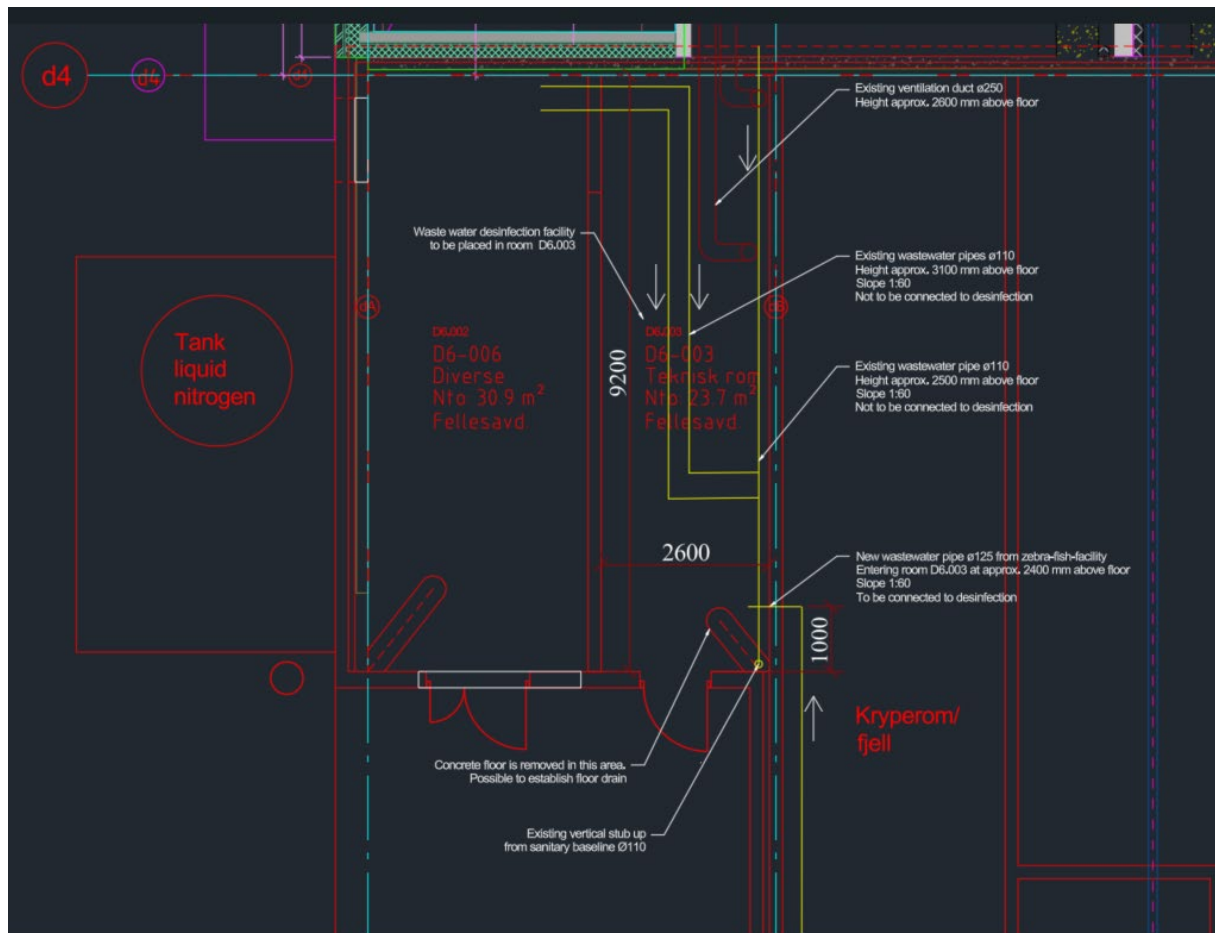


Figure 2

Room D6.003 is 9.1 m long and 2.6 m wide. Net room height is 3.5 m. Roof and walls are made of concrete. The door into the room is 2 m high and 950 mm wide. If the door is removed completely the width is increased to 1.100 mm.

Roof and walls are made of 200 mm concrete.

Room D6.002 is the adjacent room that can be made available if the space in D6.003 is insufficient. Room D6.002 is 9.1 m long and 3.6 m wide. Net height is 3.5 m. Roof and walls are made of 200 mm concrete. The door is 2 m high and 0.97 m wide.

1.2.3.2 Plumbing installations

There are multiple existing sewage pipes going through the room. The pipes are connected to the sanitary baseline through a vertical stub located in the corner to the right of the door when entering the room. All existing pipes shall be retained. The location and elevation of the existing pipes are described in the DWG-drawing of the room. See supplementary materials and attachments.

The wastewater pipe from the zebrafish facility enters the room through the wall at approximately 2.400 mm above floor level.

1.2.3.3 Water supply

A Cu 15 mm pipe cold water line is available in the room. There is no reverse osmosis water available in the room.

1.2.3.4 Compressed Air

Compressed air is available in the room at 8 bar in a Cu 15 mm line. The air is dried and of medical quality.

1.2.3.5 Ventilation and cooling

The room currently has no ventilation or cooling. Ventilation may be established based on the requirements of the installed equipment. The wall containing the entrance door is an external wall allowing for establishing air intake and exhaust openings. General requirements for ventilation must be met, such as § 13-1 and § 13-3 in "Byggteknisk forskrift (TEK17)" and "Forskrift om tiltaks- og genseverdier av 6. desember 2011" by the Norwegian Labour Inspection Authority.

Existing ventilation ducts passing through the room are shown in the attached DWG-drawing. These ducts shall be retained.

1.2.3.6 Electrical infrastructure

Existing Electrical Supply Arrangement

The room has previously housed an old water treatment unit and the former water treatment equipment located in Technical Room D6.003 has been, and are still available in the room, supplied via a local control panel installed adjacent to the existing water tank.

Based on cable tracing undertaken during the site survey, the control panel has been identified as being supplied from outgoing circuit -4F1 in distribution board UF-6. DC-D1/D2, located in Fan Room D6.004.

The available electrical supply system is 400/230 V TN-S, three-phase, four-wire, 50 Hz, with separate neutral (N) and protective earth (PE) conductors. All equipment included in the supplier's scope shall be suitable for connection to and operation on this supply system. The supplier shall state the required power demand, rated current, starting current and requirements for upstream protection.

The feeder cable is installed on cable trays routed through the service basement between Fan Room D6.004 and Technical Room D6.003 and enters the technical room through an existing wall penetration.

Existing Feeder Circuit

Feeder cable: PSFP 4×16 mm² + PE Cu

Based on the observed installation arrangement, including multiple multicore cables installed in close proximity on stacked cable trays, the theoretical cable capacity is estimated in accordance with NEK 400 reference installation method E (cable tray installation) with allowance for applicable grouping and installation correction factors:

- Current carrying capacity: approximately 64 A
- Power capacity: approximately 44 kW

The feeder cable is estimated to have a theoretical capacity of approximately 44 kW; however, the currently installed ABB S273 K 32 A protective device (-4F1) limits the available capacity to approximately 22 kW:

- Rated current: 32 A
- Available power capacity: approximately 22 kW

Distribution Board

Distribution board UF-6. DC-D1/D2 is connected to the building's backup power supply system.

Further requirements relating to electrical infrastructure, backup power and system availability are provided in Appendix 1B.

Existing Control Panel

An existing control panel associated with the former water treatment installation remains installed in Technical Room D6.003.

The control panel contains legacy electrical equipment, including fuse-based protective devices and electrical control components of an older design.

The suitability of the existing control panel for integration, modification, replacement or removal shall be assessed by the Supplier as part of the proposed Wastewater Disinfection Facility.

Supplier Information Requirements

Electrical Demand

The proposed Wastewater Disinfection Facility shall be designed based on the electrical infrastructure described in this section.

Any required modifications to the existing electrical installation, including power supply, backup power arrangements, control systems, communication interfaces and associated building services, shall be clearly identified by the supplier in the tender submission. Reference is made to Appendix 1B for detailed requirements.

1.2.3.7 SD interface for alarm and sensor integration

The Supplier shall describe all available interfaces for integration with the building management system (BMS).

As a minimum, the following operational and alarm signals shall be available for monitoring:

- Common fault alarm
- Treatment cycle active
- Treatment cycle completed
- Treatment cycle failure
- High tank level alarm
- Overflow alarm
- Mechanical filter clogging alarm
- Disinfection process active
- Disinfection process failure
- Power supply failure
- Emergency operation active

Available communication protocols (e.g. BACnet IP, BACnet MS/TP, Modbus TCP, Modbus RTU or potential-free contacts), together with any licensing requirements and additional hardware required for integration, shall be described.

All safety-critical functions must remain fully operational independently of the Building Management System.

Information regarding operational data management shall also be provided, including:

- Storage capacity for operational and treatment logs.
- Retention period for historical records.
- Available export formats.
- Possibility for automatic backup of treatment records.
- Alarm history and event logging functionality.
- Availability of remote access and remote diagnostics.
User access levels and audit trail functionality, if available.

1.3 Trial period

The requirements for the trial period are set out in Attachment 5, Veileder - Hvordan krav nedfelt i vannbehandlingsforskriften kan oppfylles. Please refer to this document for full details.

The plant shall be tested under relevant variations in load with regard to the volume and relevant composition of the water to be disinfected. It is particularly important to test the plant at high hydraulic/pollutant loads in order to establish its maximum capacity. In consultation with the manufacturer and the recipient of the plant, the testing body shall determine which load conditions are relevant and must therefore be tested for each individual plant.

The trial period shall be selected so as to cover varying load conditions and to enable operational reliability to be adequately documented.

For plants in year-round operation, the trial period shall extend over a period of at least 12 weeks. This period shall include relevant load conditions and flow volumes.

Normal operation may involve periods of complete plant shutdown during the testing period. Where the testing body considers that such periods become predominant in the assessment of the results - for example, frequent short shutdowns or fewer prolonged shutdowns - it may be decided, in consultation with the approval authority, that the trial period shall be extended. The testing body shall recommend the necessary additional duration.

Plants operated on a seasonal basis shall be tested in accordance with the same principles as plants in year-round operation. For practical reasons, the testing body shall, in each individual case, determine a testing program that provides the best possible coverage of varying load conditions.

1.4 Training and documentation

The supplier shall provide on-site training in Norwegian or English for both end users and technical/maintenance personnel. All training-related costs shall be included in the tender price.

The tender shall include a training plan containing at least:

- Course content and learning objectives for end users and technical/maintenance personnel
- Training methods and duration (hours/days), and the maximum number of participants per session
- A schedule and detailed breakdown of the training topics, including hands-on training and safety training

- A list of training materials to be provided, such as manuals, checklists, certificates and digital copies
- Identification and training of nominated “superusers” where appropriate

The supplier shall maintain records of all training participants and the level of training completed. These records shall be submitted to the purchaser.

1.5 Time of delivery, warranty and service agreement

1.5.1 Time of delivery and warranty

The warranty period shall commence upon completion of the delivery and shall remain valid for a minimum of two (2) years, or any longer warranty period offered by the supplier. Further warranty provisions are set out in section 4.4 of the General Contract Terms Goods iBOTT January 2023.

For the purpose of this agreement, the delivery shall not be deemed complete until all of the following conditions have been fulfilled (amendment to section 7.1 of the of the General Contract Terms Goods iBOTT January 2023):

- The unit has been fully installed and functionally tested
- All the agreed validation tests and trial period have been successfully completed
- All required documentation, test reports and certifications have been submitted and approved by the purchaser
- The supplier has documented and verified the successful operation of the complete water flow cycle and treatment process. This verification shall demonstrate and document the complete cycle of water flow from the zebrafish facility to the municipal drainage
- All required training has been completed
- Any non-conformities have been rectified or accepted by the purchaser
- The supplier has submitted all documentation required for the facility approval

1.5.2 Service agreement

The service agreement shall commence upon completion of the delivery in accordance with section 1.5.1.

The initial term of the service agreement shall be up to five (5) years. The purchaser may terminate the service agreement at the end of each contract year by providing written notice.

As part of the tender submission, supplier shall submit a draft service agreement, including a fixed price for each contract year within the initial term.

Following expiry of the initial term of five years, the service agreement shall be extendable in successive one (1) year periods. The supplier shall provide its proposed price(s) for each optional one-year extension no later than four (4) months before expiry of the then-current service agreement term.

1.5.2.1 Scope of the service agreement

The service agreement shall, as a minimum, include preventive maintenance according to the manufacturer's recommendations, including inspection, troubleshooting, software/firmware updates, execution of relevant test programs, calibration and validation of sensors and alarm setup, replacement and, if relevant, cleaning of wear parts, as well as any other necessary

repairs. The service agreement shall also include control and validation of the sampling point for microbiological and, if relevant, chemical residue testing.

The supplier shall include a concise description of how service will be carried out and what is included in the service agreement. This shall include:

- The scope and frequency of routine tasks (inspections, functional tests, calibrations, software updates, preventive part replacements and cleaning)
- The parts/consumables included in the agreement and annually replaced
- Parts requiring less regular replacement (and how often, e.g. every 2nd or 3rd year)
- The service and validation procedures for the microbiological sampling point
- For chemical-based solutions, the service procedures for method used to test chemical residues
- An example of the service documentation to be provided following each visit

The supplier shall specify any additional services required to comply with applicable regulatory and safety requirements, such as third-party pressure testing, inspections, or certification. The supplier shall state whether these services are included in the tender price or must be procured separately. For each required external service, the supplier shall provide a brief description of the work, the proposed service provider or required qualifications, estimated cost, lead time, and responsibility for issuing and retaining test certificates, inspection reports, and other required records. All third-party providers, testing, and documentation shall comply with applicable Norwegian regulatory and accreditation requirements, including, where relevant, Forskrift 10 October 2017 No. 1631.

1.5.2.2 Remote support and emergency repairs

As part of the service agreement, the supplier shall provide remote and telephone support with a response time within twelve (12) hours, as well as service documentation and emergency on-site repair services.

In the event of a failure, the supplier shall, within seventy-two (72) hours of receiving notice from the purchaser, or within any shorter response time offered by the supplier, attend on site and take the necessary measures to restore the unit to operational condition.

1.5.2.3 Pricing and costs

All labour, travel, accommodation and other expenses incurred by the supplier's personnel in connection with services covered by the service agreement shall be included in the fixed service agreement price.

Cost related to third party pressure testing, on-site non-emergency repairs, spare parts not covered by the service agreement and on-site emergency repairs shall be invoiced separately from the service agreement, in accordance with the supplier's agreed rates (see Pricing schedule, section 3.0) and the provisions below.

Travel costs for on-site repairs

Travel and accommodation expenses incurred in connection with separately chargeable on-site repairs shall be reimbursed at cost, subject to the purchaser's prior approval. In the case of emergency repairs, prior approval shall be obtained where reasonably practicable.

Subsistence expenses shall be reimbursed in accordance with the Norwegian Government Travel Allowance Scale applicable at any given time.

Travel time shall not be reimbursed.

1.5.3 Spare parts

The supplier shall guarantee the availability of spare parts for the water disinfection unit for a minimum period of ten years from the completion of the delivery.

The supplier shall provide a concise list of the most common wear parts (including filters that normally require replacement) and their expected replacement frequency, together with pricing and delivery data for the 10 most frequently replaced items. See Appendix 1B, section 7.2 for further details.