

**VOLUME 3**

**TECHNICAL SPECIFICATIONS**

## VOLUME 3.0

### TECHNICAL SPECIFICATIONS - GENERAL

#### CONSTRUCTION SITE

##### FENCING AND SIGNBOARDS AT THE CONSTRUCTION SITE

The Contractor must maintain the security of its activities, according to the regulatory requirements;

- 1) A temporary billboard, prepared according to the “Visibility Guidelines of the European Union”, shall be placed on visible site adjacent to the site;
- 2) The Contractor shall obtain instructions from the Supervisor regarding information to be displayed on the temporary billboard. The dimensions and text on the billboard shall be as per the requirements in the latest version of the EU “Visibility Guidelines” which can be found at [http://ec.europa.eu/europeaid/work/visibility/index\\_en.htm](http://ec.europa.eu/europeaid/work/visibility/index_en.htm). The Contractor shall not undertake or allow billposting or advertising of any kind upon the Works without the written consent of the Supervisor. At finalization of works (Provisional Acceptance), and signs erected by the Contractor must be removed;
- 3) The Contractor shall install a permanent explanatory plaque at the main site in line with the above manual and in agreement with the Contracting Authority after Provisional Acceptance.
- 4) Construction site board prepared in accordance with the Law on Planning and Construction shall be placed on visible site adjacent to the site;
- 5) The Contractor shall provide the whole information concerning the regulations and procedures governing the use of local facilities for access, transport, storage facilities and in compliance with them to take measures for providing the necessary documents;
- 6) The Contractor shall be aware of existing restrictions and shall be responsible for their observance during construction;
- 7) The Contractor shall be liable for all damages on the existing infrastructure caused by him - they shall be repaired at its expense;
- 8) The Contractor will be responsible for ensuring the control of any access or the right to leave the boundaries of the construction site, so that it does not lead to interference with the locals or damage to public or private property as a result of the entry or exit of its employees and subcontractors;
- 9) The Contractor shall indemnify and hold harmless the Contracting Authority against any accusations arising from its failure to comply with the above point, including legal fees and costs.

##### TEMPORARY SITE FACILITIES

- 1) The Contractor, prior to the start of construction works, shall submit a draft *Design for the organisation and execution of construction*. The Design must be submitted no later than 15 days before the planned start of construction works. The design must indicate the work zones, as well as areas for temporary storage of necessary construction materials and goods, and areas for temporary settlements for the personnel of the Contractor and Supervisor.
- 2) The Contractor shall provide and install all necessary facilities/installations for accommodation of its staff, including dressing and rest containers, toilets, drinking and washing water, electricity, etc. All costs for temporary facilities shall be included in the Bid.

## FACILITIES FOR THE CONTRACTOR AND SUPERVISOR

- 1) The Contractor shall hand over the fully equipped office to the Supervisors within 2 weeks of being ordered to do so.
- 2) The cost of office and accommodation shall be paid by the Contractor and shall be included in the unit prices in the Bill of Quantities.
- 3) The Contractor shall procure, at its own risk and expense, all additional facilities outside the site that may be necessary for its work.

## OFFICES FOR THE SUPERVISOR

All offices for the Supervisor shall have at least two grounded electrical sockets, rooms exceeding 10 m<sup>2</sup> floor area, having at least one additional socket per 5 m<sup>2</sup> of floor area or part thereof.

The Contractor shall supply, install and maintain in the offices, equipment and furniture which shall be new, undamaged and complete with all necessary keys.

The Contractor shall supply, install and maintain furniture such as desks, cupboards, drawing tables and plan chests, chairs and shelves, etc. in the numbers, trademarks and quality as approved by the Beneficiary and the Supervisor.

The Contractor shall arrange internet connection.

## PROTECTIVE EQUIPMENT FOR THE SUPERVISOR

The Contractor shall initially provide the Supervisor with protective clothing and equipment, as follows, and, as the Supervisor considers necessary, provide replacement items under the provisions for maintenance of the Supervisor's facilities. Prior to making this provision, the Contractor shall obtain a list of appropriate sizes from the Supervisor. As and where the Contractor's methodology, activities or planned testing programme may require additional protective equipment (such as gloves, earplugs, goggles, torches etc.) the Contractor shall make these available to the Supervisor and when the need arises.

## FACILITIES FOR THE CONTRACTOR

The Contractor shall provide and maintain on site suitable site offices for its own use. It shall also provide and maintain on approved sites, sufficient stores, tanks and workshops for the proper storage of materials, fuel plant and equipment.

The stores shall be of such size and construction to provide adequate storage and protection of stocks of material, fuel, spares, etc. in quantities ensuring uninterrupted progress of the work. Workshops shall be suitably equipped to ensure carrying out of major repairs, overhaul or modification by the Contractor of all plant and equipment in or on the Works. The Contractor shall allow in its rates for all costs related to provision of the offices and workshops for its own use.

## SITE CLEANING

The Contractor shall make every effort to keep the site tidy and in orderly manner and to take at any time every possible precaution against the contamination of subsoil and groundwater.

The Contractor shall be responsible for making all arrangements for the disposal of solid and liquid wastes from the site. Furthermore, it shall give strict instructions to all its employees to use the sanitary accommodation provided at the site.

## STORAGE OF EQUIPMENT AND MATERIALS IN PUBLIC SPACE

Construction materials and equipment shall not be stored outside the site borders.

Where Works are to be completed in public spaces, all plant and excess material shall be removed immediately from the site upon completion of the relevant task so as to limit public objections and complaints.

## TRAFFIC ARRANGEMENTS

The Contractor shall as far as required, comply with all requirements and recommendations of the Police and Authorities regarding traffic arrangements and road safety measures on public roads outside the construction sites.

The Contractor shall, where necessary, provide all barriers and traffic signs agreed by the Supervisor.

Traffic diversions, if necessary, shall be planned and arranged with the responsible Authorities by the Contractor and harmonized with the Supervisor. No diversion shall be implemented without a written consent of the responsible Authority and after given information to the Supervisor. Access to the site shall be available to vehicles of emergency services and residents in the areas.

All traffic signs and traffic control signals, as necessary and/or may be required by the Police Authority for the safe direction and control of the traffic shall be provided, placed and maintained by the Contractor on the appropriate sites and locations on the access to the sites. The location and size of all such signs and the lettering thereon shall be agreed by the Supervisor before placement of the signs.

The Contractor shall reposition, cover or remove signs as required during the progress of the works.

## CONTRACTOR'S GENERAL RESPONSIBILITIES

### MANAGEMENT OF THE PROJECT BY THE CONTRACTOR

- 1) The Contractor shall provide the Quality Assurance Plan (QAP) for the management and execution of construction works;
- 2) The QAP should reflect the management structure and clearly describe the duties, responsibilities and powers of each member of the Contractors' staff;
- 3) The representative of the Contractor and its staff must possess experience and qualifications according to the contract, RS Law and type and scope of works;
- 4) This QAP will be updated and provided again whenever there is a change in personnel.

### APPROVAL AND INSTRUCTION BY THE SUPERVISOR

Where reference is made in this Specification, the Bills of Quantities or in the drawings for approval, instruction or direction, they shall be given by the Supervisor.

Approvals, instructions or directions by the Supervisor shall not relieve the Contractor from its liabilities and responsibilities under the Contract.

### QUALITY ASSURANCE PLAN

- 1) The Contractor shall be responsible for assuring such quality of materials, works and processes that shall comply with the requirements of the Specifications.
- 2) In order to meet the specified requirements, the Contractor shall implement Quality Assurance System presented in Quality Assurance Plan containing the following details:
  - Quality control procedures;
  - Personnel responsibilities;

- Procurement procedures;
- Testing procedures;
- Equipment and measurement devices;
- Frequency of testing, measurements etc.;
- Holding points in production for inspection;
- Rejection and corrective procedures;
- Documentation and communication
- H&S and Environmental Plan.

3) The Contractor shall be liable to keep a register of all materials delivered on site or implemented in the construction to be accessed for review upon request by the Supervisor or Contracting Authority. Also, the Contractor shall maintain archive of the whole correspondence and instructions.

The Contractor shall within 7 days of the date of the Letter of Acceptance provide the Supervisor with the Organisation chart containing names, CVs and duties of all key personnel whether or not they are related to quality assurance directly.

## WORK PROGRAMME FORM OF SUBMISSIONS

The Work Programme presented by the Contractor shall consist of a detailed schedule of all construction works and phases. Once approved, the Work Programme shall be binding for the construction works on site.

### REQUIREMENTS

The Contractor shall present a Work Schedule for execution of the works with distribution of resources and manpower, including volume of works, number of workers for the stage, coordination of activities, interaction with different participants in the process, time limit for execution and sequence of the works all in accordance with Contract.

### WORK PROGRAMME

Pursuant to the requirements, the Work Programme to be submitted by the Contractor shall show the planned weekly rates of progress between the programme dates for commencement and completion of each major item or work for the various stages of construction, in accordance with the Conditions of Contract.

The Work Programme shall take into account climatic conditions, groundwater, geo-technical data, completion of critical components by the Contractor or other contractors, water supply service conditions and other conditions, to ensure the completion of the works in accordance with the Contract.

The Contractor shall not be permitted to commence any construction work on that part of the works until the Supervisor has no objection to the method statements, drawings and calculations. Sufficient time for approval of drawings materials and method statements must be allowed for in the Work Programme for each component.

The Contractor shall allow in its Programme a reasonable period for work to be carried out by Public Utility Services, Authorities and the Beneficiary where necessary. The Beneficiary will provide all necessary assistance in liaising with such Authorities.

The Contractor shall also allow in its Programme sufficient time required for provisional acceptance and for the maintenance periods (Defects Notification Period) as stipulated in the Contract.

## WEEKLY PROGRESS REPORTS

During of the execution of the Contract, the Contractor shall follow the progress of activities relative to the time schedule and shall submit to the Supervisor weekly reports for the results of its activities, conforming to the following requirements:

- 1) The Report to be provided to the Supervisor in 1 hardcopy in Serbian and English languages as well as digitally (on CD enclosed to the Report);
- 2) Diagrams with detailed progress description, Contractor's documents, delivery, construction works, assembly and tests;
- 3) Digital photos (on CD enclosed to the Report);
- 4) Linear chart (schedules) for the current Stage, showing the actual and the planned progress;
- 5) Provision of resources - actual and planned;
- 6) Diagram for labor flow - actual and planned;
- 7) Report, reflecting all considerable differences from the construction programme, and if necessary, explanation for the proposed steps to be undertaken for the completion of the approved programme;
- 8) Statistics on safety and environment protection;
- 9) Financial Statement.

When actual work progress differs from that shown in the Construction Programme, the Contractor shall submit an updated schedule to the Supervisor. The updated time schedule shall be current to the last day of a calendar month and shall show the detailed "work-as-executed" programme in respect of work carried out. They shall be submitted within ten working days of the following month at the latest.

#### PROGRESS PHOTOGRAPHS

Digital colour photographs showing the progress of the Works in detail shall be taken by the Contractor every week, from positions to be selected by the Supervisor.

The Contractor shall hand over the corresponding electronic files to the Supervisor on a CD, as well as an electronic list numbering and labeling each photograph (location, date when taken and a brief description or title).

#### CONTRACTOR'S DOCUMENTATION GENERAL

- 1) For design, works and supply use of metric units is compulsory.
- 2) All documents will be issued in English. Official documents, which are to be presented to state or municipality authorities, will be also issued in Serbian.
- 3) Works documentation (see Chapter 3.1.4.) will be in English and in Serbian, except Construction Log, which will be in Serbian.
- 4) Reports and correspondence documentation will be in English and in Serbian.
- 5) When submitted as computer files the documents shall be under Windows, compatible with following formats: texts in MS Word, Tables in MS Excel, drawings in ACAD, time schedules in MS Project.

#### DESIGN FOR EXECUTION

The Contractor shall prepare, in accordance with RS legislation, design for execution developing the drawings included in this Tender Dossier and taking into account the Contracting Authority's Requirements, written in the present Technical Specifications. Contractor's drawings will be checked and can be applied after a written consent is issued by the Supervisor and the Beneficiary.

#### WORKS DOCUMENTATION

The Contractor shall be liable to provide the Supervisor with due documentation as per local Regulations. The Contractor shall keep/maintain the following Works documentation:

- 1) Inspection Book (forms laid down by the Law of the Republic of Serbia),
- 2) Construction Log (forms laid down by the Law of the Republic of Serbia),
- 3) Measurement Book (forms laid down by the Law of the Republic of Serbia),
- 4) All necessary certificates (for material, equipment and other) during the works execution.

The Works Site Manager shall keep the Construction Log and submit the Measurement Book sheets of the executed works along with each invoice. The Measurement Book has to be verified by the Supervisor.

The Construction Manager has to enter the following data into the Construction Log:

- Number and qualification of workers executing the works,
- Number and type of construction machinery used for works execution,
- Weather conditions under which the works are executed,
- How the works are executed and if there is any deviation from the design, contract and regulations in doing so.

#### AS-BUILT DESIGN

- 1) Based on a survey of executed works, as-built technical documentation will be prepared by the Contractor and delivered to the Supervisor (in accordance with Law on Construction and Planning).
- 2) As-built drawings for all executed works must be delivered in digital form and 3 (three) printed and bind hard copies, signed by the Responsible Designer and the Supervisor.
- 3) Contractor is obliged to support the Beneficiary during technical acceptance and make necessary corrections in the submitted documentation and designs upon the request of Authorities in order to obtain a use permit.

#### OPERATION AND MAINTENANCE MANUALS

- 1) The Contractor shall provide comprehensive operation and maintenance manuals for the delivered equipment including a full technical description and operational characteristics thereof. The Contractor shall provide 2 copies in both English and Serbian of each of the manuals bound loose leaf in ring binder folders.
- 2) Manuals shall be prepared in accordance with the approved standard. Manuals shall also be subject to the approval of the Supervisor.

## **HEALTH & SAFETY AND ENVIRONMENT PROTECTION**

### **HEALTH & SAFETY**

#### **GENERAL REQUIREMENTS**

Without limiting the Contractor's obligations under the Conditions of Contract, the Contractor shall take all measures and precautions necessary to ensure the health, safety and welfare of staff, labor, and other persons authorized to be on the Site, as well as visitors and third parties. The Contractor shall prepare H&S Plan and develop detailed sequence and safety measures in the Organizational plan for the management and execution of the works.

The Contractor shall:

- 1) Fully comply with the *Law on Safety and Health at Work*.
- 2) Appoint a member of staff responsible for all matters related to health and safety for the duration of the Contract according to RS regulations.
- 3) Provide and maintain equipment in a safe working condition and adopt safe methods of work.
- 4) Adopt methods for the use, handling, storage, transport, and disposal of materials, and substances which are not injurious to health and safety.
- 5) Provide and maintain adequate lighting, signing, and fencing of the Works.
- 6) Provide adequate protective clothing and safety equipment, including such information, instruction, training and supervision as are necessary to ensure the health and safety of all persons employed on or entering on the Site in connection with the Works.

Safety equipment shall include but not be limited to:

- safety helmets,
  - protective footwear with integral steel toe-caps,
  - safety glasses, welding goggles and other eye protectors,
  - ear defenders,
  - safety harnesses,
  - high visibility reflective vests,
  - Fire extinguishers.
- 7) Provide and maintain access to all places on the Site in a condition that is safe and without risk of injury.
  - 8) Provide and maintain adequate water, waste water and waste collection, for all offices, workshops, and laboratories erected on the Site.
  - 9) Provide and maintain adequate sanitary units at locations where works are in progress.
  - 10) Appoint a member of its staff to be responsible for the safety of the Works throughout any shutdown period and notify the Supervisor of the name and contact telephone number of the responsible person.
  - 11) Report all accidents to the Supervisor and appropriate authorities at the time of occurrence or as soon as possible thereafter.

#### **TESTING AND CERTIFICATION OF MECHANIZATION AND EQUIPMENT**

- 1) The Contractor shall provide and maintain equipment for lifting, embedding and transporting materials and must comply with all relevant requirements of the standards in Serbia;
- 2) All equipment must be regularly maintained in accordance with the recommendations and standards of the manufacturer, according to local laws and recommendations of the relevant authority;
- 3) The Contractor shall prepare and update a register of certificates of testing of the equipment used on construction sites according to RS Law;

- 4) The Contractor must appoint competent personnel responsible for the operation of all kinds of equipment. They must provide evidence that they have passed training and have respective license for operating the specific equipment;
- 5) All the technological equipment (with test certificates) used on or around the site must be equipped with the necessary protective devices that will be in continuous readiness;
- 6) Should the Supervisor consider the Contractor's method of working unsafe or that there are insufficient or inadequate safety barriers or other devices or that there is insufficient safety or rescue equipment, the Contractor shall change its method of working or install or strengthen safety and rescue equipment if so instructed. Such instructions shall not relieve the Contractor of any of its responsibilities under the Contract.
- 7) The Contractor shall immediately notify the Supervisor about any accident that occurs, whether on site or off site, in which the Contractor is directly involved, and which resulted in any injury to any person whether directly concerned with the site or a third party. Such initial notification may be verbal and shall be followed by a written comprehensive report within 24 hours of the accident.
- 8) Transportation of any material by the Contractor shall be in suitable vehicles, which do not cause spillage when loaded, and all loads shall be suitably secured. Any vehicle shall be removed from the site, which does not comply with this requirement or any of the local traffic regulations and laws.
- 9) The Contractor shall ensure access to sites at all times to any authorised external institutes or experts carrying out safety inspections.

#### FIRE PROTECTION

During the performance of the Contract the Contractor shall make arrangements to the agreement of the Supervisor for the protection of the permanent works and any temporary works and any adjacent property from fire and, if required, it shall give the Fire Authority access to all facilities periodically to inspect the fire prevention arrangements.

Particular care must be exercised in connection with the operation of electric arc welding equipment, oxyacetylene cutting equipment and other processes involving the use of naked lights. Special arrangements will be necessary for the storage of highly flammable liquids on the site.

The Contractor shall remove all waste and material of a flammable nature and take other steps as the Supervisor may require but this shall not relieve the Contractor of any of its obligations under the Contract.

#### ENVIRONMENT PROTECTION

##### GENERAL

- 1) The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on or off site are carried out in conformity with statutory and regulatory environmental requirements.
- 2) The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the Works. This shall be achieved wherever possible by suppression of the nuisance at source rather than abatement of the nuisance once generated.
- 3) The provisions of these Sub-Clauses shall only be disregarded in respect of emergency work required for the saving of life or property or the safety of the Works.
- 4) In the event of any spoil or debris or silt from the Sites being deposited on any adjacent land, the Contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state to the agreement of the Supervisor.

- 5) The Contractor should comply with the guidelines of the Banks in this regards as well as those for resettlement and rehabilitation of the affected population.

The offer should include appropriate cost-effective mitigation measures, which should form part of the project cost.

*Environmental Management Plan (EMP)* shall be prepared by the Contractor incorporating proposals concerning the implementation, management and monitoring of the environmental components of the project.

Within two (2) weeks from the commencement of the works, the Contractor shall submit an EMP with operational details of its proposals to the Supervisor for approval.

#### ENVIRONMENTAL PROTECTION DURING CONSTRUCTION PERIOD

The Contractor shall use such construction methods and shall maintain all borrow/stockpile/spoil disposal area so as to assure the stability and safety of the Works and any adjacent feature, to assure free and efficient natural and artificial drainage and to prevent erosion.

The Supervisor has the power to disallow the methods of construction and/or the use of any borrow/stockpile/spoil disposal area if in their opinion the stability and safety of the Works or any adjacent features are in danger, or if they disturb natural or artificial drainage, or if the method or use of the area will promote undue erosion.

Following excavation for the works, the Contractor shall take all steps necessary to complete drainage and slope protection works in advance of each rainy season. Erosion or instability or sediment deposition arising from operations not in accordance with the Specifications shall be repaired immediately by the Contractor at its expense.

Notwithstanding approval of the intended method of working, the Contractor shall at all times be responsible for constructing the earth works in accordance with the Specifications, the Design and drawings.

#### PREVENTION OF POLLUTION

The Contractor shall ensure that its activities do not result in any contamination of land or water by polluting substances.

#### ENVIRONMENTAL CONSIDERATIONS

The following environmental protection measures shall be observed during the execution of the construction of the works:

- **Demolition material** - Reuse of demolition materials as backfill for trenches and excavations or/and hard fill for construction foundations and roadways is possible, unless contaminated or hazardous materials such as asbestos are identified. The Contractor will be responsible for environmentally safe disposal of any material resulting from the demolition and other site materials with approval from the relevant local Authorities at a designated licensed disposal facility.
- **Excavated soil** - Reuse of excavated natural soil, which is free of cohesive components, salt, sulphate and/or clay materials, may be used as backfill for trenches and excavations. The Contractor will be responsible for environmentally safe disposal of surplus materials with approval from the relevant local Authorities at a designated licensed disposal facility.
- **Ground water** - Temporary and/or permanent groundwater lowering may be required. The Contractor shall apply appropriate dewatering measures as required and shall also ensure that adequate measures are implemented to control surface water discharge.
- **Air pollution** - Construction may give rise to dust and construction equipment exhaust emissions. Due note shall be taken of the proximity of residential housing to the works.

The normal health and safety controls will be required to safeguard the residential and passing population.

- **Noise pollution** - Construction works may cause annoyance caused by noise. The normal health and safety controls will be required to safeguard the residential and passing population.
- **Maximum noise levels** - During construction works the Contractor shall comply with the local and national requirements. The Contractor shall be legally responsible and financially liable to observe Serbian environmental legislation.  
The noise levels shall be in accordance with the relevant Serbian noise environmental legislative.  
Noise and disturbance shall be kept to the reasonable minimum as far as required for this project. The Contractor's attention is drawn to the close proximity of some residential areas. All plant and tools used at such sites above or near ground level shall be silenced or of a silent type.  
The Contractor shall take all necessary steps to ensure that its workmen carry out their duties in a quiet manner particularly when working at night.
- **Pollution prevention** - The Contractor shall not pollute or unnecessarily disturb lands, roads and other places on and around the Site. No trees or other vegetation shall be removed except to the extent necessary for the Works.

#### AIR QUALITY

- 1) The Contractor shall devise and arrange methods of working to minimize dust, gaseous or other air-borne emissions and carry out the Works in such a manner as to minimize adverse impacts on air quality.
- 2) The Contractor shall utilize effective water sprays during the delivery and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather.
- 3) Stockpiles of materials shall be sited in sheltered areas. Stockpiles of friable material shall be covered with clean tarpaulins, and sprayed with water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement, except where this is contrary to the Specification.
- 4) Any vehicle transporting no coherent material shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend at least 300 mm over the edges of the side and tail boards.
- 5) In periods of high wind, dust generating operations shall not be permitted within 200 m of residential areas having regard to the prevailing direction of the wind.
- 6) Construction vehicles and machinery shall be kept in good working order and engines turned off when not in use. Appropriate measures shall be taken to limit exhaust emissions from construction vehicles, machinery and plant.
- 7) An advance warning shall be given to potentially affected persons, so that some measures can be taken by them before commencement of works, especially before dismantling/demolition.

#### NOISE

- 1) The Contractor shall consider noise as an environmental constraint in its planning and execution of the Works.
- 2) The Contractor shall take all necessary measures to ensure that the operation of all mechanical equipment and construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environment requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing

equipment in good condition so as to minimize the noise emission during construction works.

#### MEASURES FOR DECREASING THE NEGATIVE ENVIRONMENTAL IMPACT

In order to mitigate negative environmental impact, the Contractor should propose necessary actions in its Environmental Management Plan (EMP), such as:

- 1) to create adequate organisation for execution of construction works which shall comply with local construction regulations;
- 2) to provide water sprinkling of the construction site
- 3) to create organisation for control on the facilities storing fuel and lubricants and on the technical condition of the machines in order to avoid accidental oil spills;
- 4) along the construction site, waste water should be treated and sedimentation tanks and oil separators should be placed if needed;
- 5) to foresee the necessary maintaining and drainage measures for the construction site, access roads and service roads, in order limiting the erosion processes;
- 6) to specify the quantity and type of waste and how its disposal is intended to be transported and removed from the site area;
- 7) Measures for fast conservation of unfinished works at unfavorable conditions.

#### MATERIALS

##### GENERAL

- 1) All materials used shall be of the best quality as specified and described in the Specification, Design, Drawings and the Bills of Quantities. Where in the Design Drawings and/or BoQ the products are brand named, this should be understood as supplemented by 'or equivalent'. These materials shall be procured from approved manufacturers or suppliers.
- 2) The Contractor must secure the compliance with the Specification of materials or plant to be provided under this Contract before the supplier or manufacturer is proposed for approval to the Supervisor.
- 3) The Contractor shall take into consideration the local climatic and other environmental conditions when selecting and proposing the materials. The quality of the material has to be confirmed by the attests and suppliers certificates, all according to TS and RS regulations.
- 4) Whenever possible, the Contractor shall provide equipment of a similar nature from the same manufacturer, e.g. electric motors;

The Contractor shall note that particular attention will be paid to these requirements. In cases where the proposed equipment is not standardized with regard to manufacturer and type, the Contractor shall be required to provide conclusive technical justification; considerations of price alone will not be accepted. Equipment and components that have not been standardized will not be accepted.

##### ORIGIN

Certificates of origin have to accompany the products proving that supplies originate from an eligible country as stated in GC of the Contract.

##### CONFORMITY OF MATERIALS

All materials implemented during construction shall be in compliance with the requirements of:

- Requirements of the local legislation;
- REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011 laying down harmonized conditions for the marketing of construction products;

- The present Technical Specifications;
- Requirements of the design documentation.

All materials applied shall be accompanied with quality certificates to prove their concordance with the requirements set out in the design, the Specification and the Code for Civil Construction Works.

The Contractor shall make diligent efforts to procure the specified materials. Where, due to different reasons, the materials required by the Contract are not available, substitute materials may be used but with the prior approval by the Supervisor and the Designer.

## **TECHNICAL REQUIREMENTS FOR EXECUTION OF WORKS**

### TECHNICAL REQUIREMENTS

#### PURPOSE OF THE TECHNICAL REQUIREMENTS

The purpose of the technical requirements is to provide quality performance of works to comply with technical regulations and standards. Therefore, the Contractor is obliged to adhere strictly to them and to perform all the works that are the subject of this project, in accordance with technical requirements, design documentation, accompanying drawings and Bill of Quantities. In addition, technical requirements define the method of measurement. Therefore, bidders are required to include all costs for not separately analyzed and measured items in the unit prices of the existing ones.

### GENERAL TERMS

#### NOTICE OF COMMENCEMENT

The Contractor shall give a written notice to the Supervisor of its intention to commence works (Notice of Commencement).

Also, according RS law, Notice of Commencement must be submitted to competent Local and National Authority.

The works shall not be commenced until written approval has been received from the Supervisor.

#### TECHNICAL SPECIFICATION FOR WORKS

Technical Specifications are an integral part of the Tender Documentation, and are annexed to the Works Contract.

The Contractor is fully familiar with all details of the provided design documentation, as well as with all local regulations, local standards (SRPS), common practice of trade and circumstances for their execution. Nevertheless, it is understood that, whenever local regulations, local standards (SRPS), or any common practice of trade, are subject to any interpretation, clarification, ambiguity, or dispute, a ruling by the Supervisor will prevail, always provided that such ruling will be fully in compliance with and will be based on the subject local regulations, local standards (SRPS), as well as in accordance with common practice of trade, and any such ruling by the Supervisors and subsequent instruction in that respect, will not constitute any ground for variation order and/or any additional payment.

Communication between the Contractor and the Beneficiary (also Designer), during the works will be carried out exclusively through the Supervisor.

All works must be carried out precisely and professionally. Prior to application, the Supervisor must examine all material and all his comments referring to material and quality of work will be obligatory for the Contractor. The agreed prices include all fully completed works and final products ready for use.

The Contractor will be responsible for any and all damages caused by the Contractor during any works, to any third party, structure, existing installations of adjacent buildings, and any and all repair works and compensations of any kind will be at the Contractor's expense.

Prior to the commencement of the works, and also in the course of the execution of every work item, the Contractor will ask the Supervisor for any explanations and clarifications required, therefore, the Contractor will solely bear full material responsibility for all works not completed in accordance with the concept and details of this specifications.

The Contractor will be responsible to keep records on the progress of works in the measurement book and have it controlled and verified by the Supervisor.

Upon the completion of the works the Contractor will remove from the building site and other used areas all its tools, machinery, surplus material, etc. so as to have the site neatly arranged as defined in the investment-technical documentation, and all other areas restored in same condition as before the construction.

All construction works must be carried out under the conditions and in the manner prescribed by RS Law on Construction and Planning.

For all works, applicable Serbian regulations and standards shall prevail.

#### TECHNICAL STANDARDS AND REGULATIONS

In accordance to these Technical Requirements the Contractor shall ensure that its performance incorporates the following key principles

- For all required works and services specified in this Tender Dossier, the relevant Serbian standards and codes of practice shall apply. In any case, if Serbian standards are more strict or dominant, they shall apply to replace other standards given or not in other parts of this document.
- For works and services where no relevant Serbian standards or codes of practice exist the latest European Standards and code of practice shall be applied.
- The proposed application of other standards and code of practice for certain works and/or services shall be such as to ensure equal or higher than specified quality and safety of works, and to facilitate operation, inspection, maintenance, repairs, lubrication and similar operations.
- In any case, National standards and code of practice have to be used for each service and work, accompanied with explanations, to demonstrate to the agreement of the Supervisor that application of these standards and code of practice shall give required quality, safety, functionality and durability of the completed works.
- The applicable version of any standard shall be that valid 28 days prior to the latest date for submission of tenders.

#### MATTERS NOT COVERED BY THE STANDARDS

Any materials and workmanship not fully specified herein or covered by the Standards, Codes or Manuals shall be of such type and quality so as to produce a required quality of work. In such circumstance the Supervisor shall determine whether all or any of the materials offered or delivered to the site are suitable for use in the Works and the Supervisor's decision in this respect shall be final and conclusive.

#### CIVIL WORKS

The term "Civil Works" means the obligations of the Contractor to perform all manufacturing, excavation, building, structures and other construction Works.

All other works from the Contractor's Offer whether specified or not in the BoQ or any other Contract Document (including the Contractor's proposal), as necessary for the completion of the Works and the operation thereof, and as required under the terms of the Contract;

## MECHANICAL AND ELECTRICAL INSTALLATIONS

The term "Mechanical and Electrical Installations" shall mean the obligations of the Contractor under the Contract to cover all manufacturing, delivery, assembling and installation, testing and commissioning of the required mechanical and electrical equipment and machinery for the proper completion of Works, which shall be performed by the Contractor.

## CONTRACTOR'S EQUIPMENT

Details of all Contractors' Equipment to be used in the execution of the Works shall be submitted to the Supervisor prior to its use.

The Supervisor's consent to use such Equipment will not be unreasonably withheld, but if, in the Supervisor's opinion, circumstances arise which make it desirable that the use of the said Equipment should be suspended either temporarily or permanently, the Contractor shall change the method of performing the work affected and it shall be deemed to have no cause for claims against the Supervisor on account of having to carry out the work by another method, nor it shall be deemed to have cause for claim if any order issued by the Supervisor results in the Contractor's Equipment having to stand idle for a period of any duration whatsoever or having to be removed.

## SUBCONTRACTED WORKS

The Contractor shall appoint subcontractors for the work for which the Contractor is not experienced, recognized or approved.

The Contractor shall submit for consent, the names of all proposed subcontractors and suppliers of special manufactured items with full details of the company, reference list and all other documentation needed for approval of the subcontractors and shall indicate the precise sections of the work for which each will be responsible.

The Contractor shall be solely responsible for the overall co-ordination of the Contract. Direct formal communication between its sub-contractors and the Supervisor will not be allowed.

## METHOD STATEMENTS

The Contractor shall provide, in writing, a description of the arrangements and methods it intends to apply for the execution of the Works.

Method Statements (MS) shall show in detail the methods proposed by the Contractor for carrying out the principal activities of construction in full safety. In particular, the Contractor shall indicate the resources (plant, personnel, materials) to be allocated, timing and sequencing, emergency/contingency measures, and any other information required to clearly detail the proposed methods. All necessary health and safety and environmental measures required shall be clearly indicated.

This will be supported by calculations for temporary works for supporting excavated faces and shuttering of concrete. Flowcharts, sketches and drawings shall be included if necessary.

Proposed MS will be submitted to the Supervisor (also to the Beneficiary) for approval. The Supervisor (in cooperation with the Beneficiary's representative) will review and provide its comments within 5 working days. The Contractor shall make final corrections (if any) and submit them to the Supervisor for final approval, 5 working days before the commencement of relevant work. Written agreement shall be obtained before any work is commenced.

## PROVISIONAL TIME SCHEDULE

The Defects Notification Period (DNP) shall be twelve (12) months under the Contract and shall commence after completion of the Works.

The duration and sequence of the various activities constituting the Works may be varied by the Contractor to suit its own proposals for carrying out the works, subject to the approval of the

Supervisor, but no consideration will be given to any request by the Contractor to extend the Contract completion dates.

#### STANDARDS ON THE SITE

The Contractor shall purchase and keep on Site at least one copy of each of the relevant Standards, Codes and Manuals or approved National Standards which are referred to in the Specification. In addition, the Contractor shall keep on Site a copy of any other Standard, Code, Manual, or National Standard, which applies to materials supplied.

Copies of the standards shall be made available for reference at all times at the office of the Supervisor.

Should the Supervisor require an English or Serbian translation of any of the Standards or Manuals, the Contractor shall provide a translation within 7 days of receiving a written request from the Supervisor.

### TECHNICAL SPECIFICATIONS OF THE MOBILE FIRE EXTINGUISHING EQUIPMENT

#### Hand-held portable fire extinguishing apparatuses using powder - Technical requirements

The apparatuses shall have cylindrical shape. The range of the jet must be minimum 3 m, and the quantity and pressure of the propellant gas must ensure equal powder ejection. The remaining powder in the tank must not exceed 10% of the original quantity. The apparatuses shall be operational at temperatures from – 20 to + 45oC. The free play of the units for activation of the apparatuses (button, handle, lever ...) must be  $3 \pm 1$  mm, and the hand wheel on the valve of the propellant gas bottle shall have free play at the angle of 30°. The direction of opening of the hand wheel shall be counter-clockwise. The apparatuses shall always be used in the upright position.

The apparatuses having filings over 3 kg (S-6, S-9, S-12) must have the discharge nozzle (with a mechanism for release and interruption of the powder jet) connected to the tank, by means of a flexible hose 800 mm long, and the discharge nozzle and the hose must be of materials that do not conduct electricity. The apparatuses type S shall be delivered filled (the powder and the propellant gas under pressure).

The apparatuses shall be filled with the powder up to 3/4. In smaller apparatuses, carbon dioxide shall be used as the propellant gas and, for bigger apparatuses, nitrogen. The allowable deviation in the filling of apparatuses with powder shall be:

- For apparatuses up to 3 kg:  $\pm$  up to 3% ;
- For apparatuses over 3 kg:  $\pm$  0.2 kg.

The allowable deviation in the quantity of gas under pressure in a steel bottle shall be  $\pm$  2%, and the allowable deviation in the pressure of gas in the tank, which is to be under constant pressure, shall be  $\pm$  10% of the indicated operating pressure at the temperature of 20°C.

Technical data for hand-held portable fire extinguishing apparatuses using powder:

Apparatus	Powder content [kg]	Gas content [g]	Gross weight [kg]	Action time [s]	Jet range [m]	Operating pressure [bar]	Test pressure [bar]	Safety valve [bar]
S-0,5	0.5	10	1.6	4-5	3-4	10-12	20-25	16
S-1	1	20	2.5-3.2	7-8	4-5	12	20-25	16
S-2	2	36-40	4.2-5.3	8-12	4-5	12	20-25	16
S-3	3	50-60	5.5-7	12-17	4-5	12-15	20-25	16
S-6	6	120-130	11-12	12-15	4-6	12-14	22-25	16-19
S-9	9	160-	15.7	20-22	4-6	12-14	22-25	16-19

		200						
S-12	12	200-250	18-19	25-28	4-6	12-15	22-25	16-19

There are various workmanships (versions) of the apparatus type S, but all of them function in the same way in principle.