

Kosovo Challenge Fund - Support Programme to vocational education and training (VET) in Kosovo

Project

**KCF 100004 - KOS Prishtina
Tempulli Academy, Prishtina, Kosovo**

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**ANNEX 2
TECHNICAL SPECIFICATIONS**

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Table of Contents

1	PROJECT OVERVIEW	4
2	BACKGROUND INFORMATION RELATED TO AKADEMIA “TEMPULLI”	4
3	PROJECT DESCRIPTION	5
4	SCOPE OF WORKS	5
5	QUALITY AND COMPLIANCE STANDARDS	7
6	SUPERVISION AND INSPECTION	7
7	TIMELINE AND PHASING	7
8	HEALTH, SAFETY, AND ENVIRONMENTAL (HSE) REQUIREMENTS	8
9	DOCUMENTATION AND REPORTING	8
10	ADDITIONAL REQUIREMENTS	9
11	TECHNICAL SPECIFICATIONS	9
XI.1	CIVIL WORKS.....	10
IX.1.1.1	CONCRETE AND FORMWORKS	10
IX.1.1.1.A	STANDARDS	10
IX.1.1.1.B	READY MIX CONCRETE.....	10
IX.1.1.1.c	CONCRETE TESTING	11
IX.1.1.1.d	DEPOSITING IN WORK	11
IX.1.1.1.e	CURING AND PROTECTION	12
IX.1.1.1.f	MATERIALS FOR SHUTTERING	13
IX.1.1.1.g	REMOVAL OF SHUTTERS.....	13
IX.1.1.1.h	REINFORCEMENT.....	13
XI.1.2	STEEL WORKS	14
IX.1.3.a.1	REFERENCE STANDARDS	14
IX.1.3.b	MATERIAL	14
IX.1.3.c	WELDING	14
IX.1.3.d	TECHNICAL DOCUMENTATION BY THE MANUFACTURER	15
IX.1.3.e	ANCHORING AND BOLTING	15
XI.1.3	MASONRY.....	16
IX.1.3.f	WALLS AND PARTITIONS	16
IX.1.3.g	PLASTERING.....	16
XI.1.4	FLOORING.....	16
IX.1.4.a	CEMENT SCREED AS BASE FOR FLOOR APPLICATION REQUIREMENTS	16
IX.1.4.b	EPOXY COAT FLOORING	17
IX.1.4.c	OAK WOOD PARQUET FLOORING	18

XI.1.5	CERAMIC FLOOR AND WALL TILES	18
IX.1.5.a	Floor:	18
IX.1.5.b	Wall:	18
IX.1.5.c	NATURAL GRANITE FOR STAIRS	19
XI.1.6	JOINERY - DOORS, WINDOWS AND ASSEMBLIES	19
IX.1.5.a	DOORS	20
IX.1.5.b	EXTERNAL ALUMINIUM WINDOWS SYSTEM	21
IX.1.5.c	EXTERNAL ALUMINIUM DOORS	22
XI.1.7	FAÇADE PANNELLING HIGH-PRESSURE LAMINATE (HPL) FACADE PANELS	23
IX.1.7.a	General Description	23
IX.1.7.b	Material Specifications	23
IX.1.7.c	Thermal Insulation Layer	24
IX.1.7.d	Performance Characteristics	24
IX.1.7.e	Substructure & Fixing System	25
IX.1.7.f	Installation Method	25
IX.1.7.g	Durability & Maintenance	25
IX.1.7.h	Warranty & Compliance	25
XI.1.8	ALUMINIUM AND GLASS ENCLOSURE	25
IX.1.8.a	General Description	26
IX.1.8.b	Scope of Work	26
IX.1.8.c	Technical Specifications	26
IX.1.8.d	Performance Requirements	27
XI.2	WATER AND SANITATION WORKS	27
XI.2.1	GENERAL	27
XI.2.2	QUALITY CONTROL	28
XI.2.3	WASTE PIPES, FITTINGS AND JOINTING MATERIAL	28
XI.2.4	POLYETHYLENE WATER PIPES & FITTINGS	28
IX.2.4.a	General	28
IX.2.4.b	Pipes	28
IX.2.4.c	Pipe Sleeve (Conduit)	29
IX.2.4.d	Manifold	29
IX.2.4.e	Distribution Fittings:	29
XI.2.5	APPLICATION REQUIREMENTS	29
XI.3	ELECTRICAL WORKS	30
XI.3.1	SOLAR SYSTEM	30
IX.3.1.a	General Description	30
IX.3.1.b	Components & Specifications	31
IX.3.1.c	Performance Requirements	32
IX.3.1.d	Final Inspection & Testing:	32
XI.4	MECHANICAL WORKS	32
XI.4.1	ELEVATOR	32

1 PROJECT OVERVIEW

An improvement in vocational education and training (VET) in the Western Balkans is urgently needed to boost skills of the labour force including the labour market competitiveness of young people.

Youth unemployment, combined with a lack of skilled labour among the enterprises, characterise the economic situation in the Western Balkans. Hence, the aim of the Regional Challenge Fund (RCF) is to increase the employability of VET students by reinforcing a cooperative training approach in the six economies of the Western Balkans: Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia.

The Fund's objective is to strengthen the labour market relevance of vocational education and training by funding investments in equipment and infrastructure for training providers that engage in cooperative training activities with partnering enterprises.

In addition to advisory support, envisaged improvement of infrastructure is imperative for successful operation of VET. Schools need to have "working" space where students can practice what they learn in theory. However, not all schools have these working spaces. Very often they do not have a working space for each profile they offer, and those that do often lack the necessary equipment for adequate preparation of students for working in the enterprise.

Therefore, the main two activities will concern the following:

- Adaptation and/or rehabilitation of VET relevant infrastructure. The adaptation of buildings is strictly limited to those buildings effectively used for practical training (e.g., workshop building and/or laboratories).
- Procurement of standard equipment and tools to ensure a reasonable minimum standard of practical training at the VTI. Procurement of special equipment reflecting specific workplace requirements of cooperating enterprises including procurement of other material such as training material and consumables.

2 BACKGROUND INFORMATION RELATED TO AKADEMIA "TEMPULLI"

Akademia Tempulli is a private institution of higher education established in 1992. Aakademia Tempulli has tradition in private education in Kosovo, in training and educating attendees in the field of traffic. So far, a large number of students and attendees of various professional courses have passed. This work has influenced the increase of employment and employability of people in Kosovo, the increase of traffic safety and the improvement of the quality of the offer of tertiary vocational and higher education in Kosovo

Part of this initiative involves the infrastructure improvement of Kolegji Tempulli, located in Prishtina, Kosovo. The renovation project aims to upgrade and modernize an existing facility through a series of

construction and renovation activities, and includes various structural, architectural, and MEP (Mechanical, Electrical, and Plumbing) works.

3 PROJECT DESCRIPTION

Kolegji Tempulli is located in the following address: 158 Eduard Lir, Prishtina 10000, on the cadastral parcel 4389-7, Cadastral zone: Prishtina. The building to be renovated is a 5-storey building including basement. The approximate surface area per floor are :

- Basement 70 m²
- Ground floor 350m²
- First floor 290m²
- Second Floor 290m²
- Attic Floor 160m²

Further information on what spaces each floor contains may be found on the detailed drawings as part of the overall Technical documentation.

4 SCOPE OF WORKS

The Contractor's scope of works shall include all required implementation activities to ensure the correct and proper realization of the projects as defined in the drawings and specifications of the TD, construct and complete to the acceptance of the Supervisor as specified in the Tender and Contract documents. The works shall include, but not necessarily be limited to, the following works:

Architectural Civil

- Construction of new partition Masonry walls, Plastering and Final Paint
- Flooring works : Epoxy and Parquet flooring
- Ceramic Floor and wall tiling
- Natural granite stair coverings
- Carpentry works :
 - Interior : Wooden doors, PVC doors. Aluminum doors
 - Exterior: Sliding aluminum doors, Aluminum windows
 - Construction of Aluminium and glass enclosure structure on the garden attached to the building
- Façade works – New ventilated façade (front), and painting other sides
- Landscape works – Concrete block pavements
- Other minor works: Metal sheet works, gypsum board partitions, minor excavations

Structural works

- Construction of a steel structure for an Annex building
- Construction of an Elevator cage from Reinforced Concrete, to the whole height of the building, including cutting of existing slab

Hydro technical installations

- Water supply network
- Sewage network
- Sanitary fixtures

Electrical works

- Solar system

Mechanical works

- Elevator

Important Note: Certain interrelated works will be carried out directly by the Beneficiary's Contractor as part of its direct investment and are not included in the Main Contractor's scope. However, specific elements will require coordination with the School's engaged Contractor to ensure seamless integration

Direct investment from School will include:

Structural works

- Demolitions , whole scope of demolitions to make the building ready for works , including but not limited to :
 - Demolition of existing Annex building
 - Demolition of existing Internal Stairs
 - Opening in the slab for introduction of new stairs
 - Demolition of all windows and doors
 - Demolitions of partitions, flooring,
 - Existing external pavement
- Construction of new stairs inside the building
- Construction of new slabs in the areas of demolished stairs

Electrical works

- Whole scope will be covered by School through direct investment, coordination will be needed for incorporation of the wiring before final paint and integration of the new Solar System to Electrical system

Mechanical works

- Whole scope will be covered by School through direct investment, coordination will be needed for incorporation of the piping before final paint and integration of the Elevator to Electrical system

5 QUALITY AND COMPLIANCE STANDARDS

All work on this project must strictly comply with specific country legislation of Republic of Kosovo related to Construction. In addition to meeting industry standards, local building codes, and energy efficiency requirements, the project will follow legal provisions that govern construction practices, safety, and quality assurance in Republic of Kosovo. The supervising entity will ensure that quality control measures are implemented at each phase of the project, with oversight in line with these regulations.

Contractors are required to provide certifications for all materials and labor, verifying their adherence to specified standards and legal requirements. Materials used on-site must come with documented proof of compliance, and all labor must be performed by certified professionals to meet quality and safety expectations. Regular inspections by the Supervisor will confirm adherence to these standards, ensuring that each element of the project meets the legal and regulatory requirements set forth by Rep. of Kosovo law.

The Contractor shall have available site authorized laboratory to carry out the specified tests on materials to be incorporated into the permanent works

Any work which fails to comply with Specifications shall be rejected and the Contractor shall, at his own expense, make good any defects, as directed by and to the satisfaction of the Supervisor.

6 SUPERVISION AND INSPECTION

The project will have a dedicated on-site supervision team comprised of qualified professionals from each relevant discipline. This supervision team will oversee all aspects of the work, ensuring that each phase adheres to the project's technical and administrative requirements. A structured inspection and approval process will be followed to ensure full compliance with design specifications, safety standards, and quality benchmarks.

The Contractor must appoint a dedicated Project Manager responsible for coordinating all work activities with the supervision team. This Project Manager will act as the primary liaison, facilitating effective communication and ensuring that all work is executed according to the specified timeline, quality standards, and administrative guidelines throughout the entire process, guaranteeing that the project meets both regulatory and project-specific standards.

7 TIMELINE AND PHASING

The expected timeline for the completion of works on this project is 3 (three months), with an anticipated start date in the spring of 2025. The Contractor is required to submit a detailed timeline that outlines the phases of work and aligns with this overall project schedule. This timeline should include major milestones, detailing the sequencing of activities and anticipated completion dates for each phase. The plan will be reviewed and approved by the project team to ensure that all phases are coordinated and achievable within the designated timeframe, allowing for efficient and timely project delivery.

8 HEALTH, SAFETY, AND ENVIRONMENTAL (HSE) REQUIREMENTS

All Health, Safety, and Environmental (HSE) practices for this project must comply with Kosovo's legislation and regulatory requirements. The Contractor is responsible for adhering to all HSE standards, which include effective waste management, noise control, worker safety protocols, and environmental protections. To ensure full compliance, the Contractor must designate a qualified HSE Officer who will oversee the implementation of all HSE measures on-site.

Additionally, the Contractor is required to submit documentation verifying compliance with proper waste management practices, including disposal and recycling processes as per Kosovo's environmental regulations. All relevant HSE protocols must be documented and followed rigorously, ensuring a safe working environment and minimal environmental impact throughout the project.

9 DOCUMENTATION AND REPORTING

A dedicated Project Manager (PM) from the Contractor's team will be responsible for submitting regular progress reports, photographic documentation, and maintaining all required on-site documents in compliance with Rep. of Kosovo legislation. This PM will ensure that all project records, and inspection reports, are kept up-to-date and readily accessible for review by the supervision team.

IX.1 WORK REGISTER (SITE DIARY) AND SURVEY DIARY (MEASUREMENT BOOK)

A Work Register shall be kept on the Site by the Contractor, who shall enter in it at least the following information:

- (a) the weather conditions, interruptions of work owing to inclement weather, hours of work, number and type of workmen employed on the Site, materials supplied, equipment in use, equipment not in working order, tests carried out in situ, samples dispatched, unforeseen circumstances, as well as orders given by the Supervisor;
- (b) detailed statements of all the quantitative and qualitative elements of the work done and the supplies delivered and used, capable of being checked on the Site and relevant in calculating payments to be made to the Contractor;

The Work Register shall be arranged according to the format established by the law of Kosovo or as instructed by the Supervisor; The Work Register shall be, open for consultation at any time by the Supervisor or his Representative or by the members of the Beneficiary's team.

Unless otherwise specified the contract, the value of the work executed in accordance with the Contract shall be established and calculated by measurement. The dimensions, notes, calculations and drawings required for establishing the quantities in the course of the survey of the Works shall be entered into the Survey Diary. The Survey Diary shall be kept by the Contractor continuously on the basis of the survey performed in accordance with the various stages of completion.

IX.2 AS-BUILT DOCUMENTATION, OPERATION AND MAINTENANCE MANUALS

The As-built detailed drawings and Operation and Maintenance Manuals (O&M) shall be prepared in English and albanian languages, as applicable, to the approval of the Supervisor on behalf of the Contracting Authority in 3 copies.

The Contractor shall also provide all spare parts and items of wear (filters, seals, light bulbs, etc.) required to operate the building for 1 year and prepare a schedule of items the Beneficiary will require to purchase after the 1 year in order to maintain the building correctly and professionally. The Contractor shall submit to the Supervisor, all such documentation as well as all warranties and/or guarantees and operation manuals for the installed plant and equipment, all in three copies and in electronic format.

IX.3 TRAINING

The Contractor shall be responsible for training the selected technical staff employed by the Beneficiary per scheme by means of on-site training for each type of equipment and technical appliance and make him/her aware of regular maintenance Specifications, all in accordance with the particular technical specifications.

10 ADDITIONAL REQUIREMENTS

The Contractor is responsible for establishing and maintaining a well-organized construction site, ensuring safe and convenient accessibility for workers and equipment. This includes setting up a temporary office structure on-site to facilitate project management and coordination. All necessary utility connections, including power and water supply, must be established and paid for by the Contractor for the duration of the construction works.

The Contractor shall confine his operations within the allocated Site, or such other areas as may be agreed between the Supervisor and Contractor.

The Contractor shall maintain the Site in a clean, tidy and safe condition during the period of construction and commissioning. The Contractor shall remove any disused materials and other debris arising in connection with the Works from the Site as it arises. The Sites shall not be taken over until such material has been removed.

The Contractor shall prevent vehicles entering or leaving the Site depositing mud or other debris on the surface of the adjacent roads or footpaths. Any materials so deposited shall be removed at the earliest practical opportunity.

The Contractor shall provide adequate facilities and toilets, as required to meet the applicable statutory provision, for use of his labour force on the Site.

The Contractor shall provide, maintain and remove on completion, office for the exclusive use of the Supervisor and his staff. The layout, positions and arrangement of the site office shall be agreed with the Supervisor prior to erection.

11 TECHNICAL SPECIFICATIONS

The technical specifications for this renovation project require that all materials, brands, finishes, and installation methods strictly adhere to the standards outlined in the Design Drawings and Bill of Quantities (BoQ). Each item in the Design drawing and BoQ provides detailed information on specifications, ensuring that the highest quality materials and precise methods are used for all aspects of the work.

XI.1 CIVIL WORKS

XI.1.1 CONCRETE AND FORMWORKS

Concrete shall be composed of Ordinary Portland cement, fine aggregate, coarse aggregate, water and additives if and when directed. Ready mixed concrete will be used subject to the Supervisor's approval provided it can be placed within the time Specifications specified, and complies with all of the engineering norms.

IX.1.1.a STANDARDS

The Contractor shall carry out the works described in accordance with the appropriate standards or equivalent local or international standards. The main standards are, but shall not be limited by the following:

a) The Classes of Concrete strength to be used in the works are the following:

Class of concrete (nominal test cylinder diameter 15 cm, height 30 cm / cube 15 cm x 15 cm x 15 cm strength, each 28 days after mixing), according to DIN EN 206:

- C12/15 15 MPa
- C30/37 37 MPa
- C35/45 45 MPa

The classes of concrete shall be used on the following building elements:

- C12/15 for plain concrete for screeds and encasements
- C30/37 for reinforced concrete foundations, beams, columns, slabs, walls.
- C35/45 for reinforced concrete columns.

IX.1.1.b READY MIX CONCRETE

Concrete obtained from a single supplier of ready-mix concrete may be used in the Works subject to the written approval of the Supervisor. Such approval will not be given until the Supervisor is satisfied that the organisation and control of the manufacture and delivery of all ready-mix concrete is in accordance with the Technical Specifications.

If the Contractor proposes to use ready mixed concrete he shall submit to the Supervisor for his approval full details and test results of the concrete mixes. The Supervisor may approve the use of ready mixed concrete provided that:

- The proposed mixes, the material to be used and the method of storage and mixing comply with the Specifications of the Specification; and
- Adequate control is exercised during mixing.

Approval to the use of ready mixed concrete may be withdrawn if the Supervisor is not satisfied with the control of the materials being used and control during mixing.

IX.1.1.c CONCRETE TESTING

The Contractor shall make all necessary arrangements for the sampling and testing of fresh and hardened concrete in the extent and numbers of samples required by DIN 1045-1.

Slump tests shall be carried out at such times and places as the Supervisor may direct and shall be used as a guide to the consistency of each class of mix. The degree of slump will be decided by the Supervisor following Trial Mix Tests and the figure given shall be adhered to thereafter.

Crushing tests shall be carried out on concrete cubes formed in 150 mm moulds.

Prior to the commencement of construction of the Works concrete test cubes shall be taken and tested in accordance with the Specifications of these Technical Specifications.

During the course of construction of the Works concrete test cubes in sets of four shall be made at such times and places as the Supervisor may direct and in any case at not less than the average rate of one set of cubes per 20 m³ of concrete. Two cubes from each set shall be tested at an early age (normally 7 days) as approved by the Supervisor and the results so obtained shall constitute part of the Contractor's quality control procedure. The remaining two cubes from each set shall be tested after 28 days and the average of these two results shall be taken as the Test Result for use in judging compliance with the characteristic strength Specifications of the Technical Specifications.

Particular care must be taken to ensure that the test cubes are stored under uniform conditions throughout the year, including a complete covering of damp thick sheet or similar approved material constantly sprayed with water whilst in the moulds and during any transit between Site and laboratory, and also including subsequent storage in water kept strictly within the specified temperature range.

The cost of sampling, making and curing Works test cubes together with the provision of moulds, all other necessary equipment and apparatus and the packing and transport to the laboratory, shall be included in the prices.

All cubes shall be marked at the time of casting, with the date, class of concrete and other necessary markings to identify the part of the Works, from which they are taken.

IX.1.1.d DEPOSITING IN WORK

The methods of conveying and depositing concrete shall be such as to prevent segregation of the materials and shall be approved by the Supervisor before concreting begins. The placing and

compaction of concrete shall be carried out under the direct supervision of a competent member of the Contractor's staff.

Should the Contractor propose to use concrete pumps for the transporting and placing of concrete. He shall submit full details of the equipment and operating techniques he proposes to use for the approval of the Supervisor.

Where concrete is conveyed by chutes or pumping the plant used shall be designed to ensure continuous and unimpeded flow in the chute or pipe. The delivery end of the chute or pump shall be thoroughly flushed with water before and after each working period and shall be kept clean. Water used for this purpose shall be discharged away from any permanent works.

Before the commencement of concreting operations for any particular section of the Works, the Contractor shall satisfy the Supervisor that sufficient pumps are in working order, including adequate stand-by equipment, in order to ensure the proper mixing of the concrete required during the period of placing.

Concrete shall be placed directly in the Works as soon as possible without the need for additional handling and not more than 45 minutes after mixing and in any case, before the initial setting has taken place. If any delay has occurred after mixing and the concrete has begun to set, it shall not be used in the Works and shall be removed from the site. Unless otherwise agreed by the Supervisor on the basis of satisfactory site trials concrete shall not be dropped into place from a height exceeding 2 m.

Concreting of any section or unit shall be carried out in one continuous operation up to the construction joints. Interruption of the concreting will not be allowed concreting water retaining structures. For all other structures no interruption of the concreting will be allowed without the approval of the Supervisor. Where deposition of concrete has to be interrupted, precautions shall be taken to ensure satisfactory adhesion of later batches of concrete to that previously placed.

Where delays of more than one hour has occurred between concreting operations in one section or unit of work, concreting shall only be resumed when, in the opinion of the Supervisor, the previously placed concrete has had ample time to harden and the resulting joint shall be treated as a construction joint. At all times when concrete is being placed, a competent steel fixer shall be in continuous attendance to adjust and correct the position of any reinforcement, which may become displaced.

Transportation of concrete directly over fixed reinforcement steel during concreting shall not be allowed unless proper provisions are made to avoid displacing or damage to the reinforcement.

IX.1.1.e CURING AND PROTECTION

Concrete shall be protected from damage by climatic conditions (direct sunlight, rain, snow or frost), running water or mechanical damage during curing. All methods to be used for curing and protection of freshly placed concrete shall be subject to the prior approval of the Supervisor.

The maximum and minimum ambient temperatures and humidity shall be measured and recorded each day by the Contractor. The records shall be made available for the Supervisor's inspection.

All exposed surfaces shall as finishing proceeds be covered with a wet hessian sheet followed by a reflective polythene sheet. These shall be securely fastened around the edges and supported in order

not to damage the finished concrete surface. As soon as practicable the hessian and polythene shall be lowered into close contact with the concrete and securely weighted or fastened down to prevent wind blowing underneath. The hessian sheet shall be maintained in a moist condition at all times and shall be inspected at intervals not exceeding 6 hours. Concrete shall be kept moist on exposed surfaces for a period of not less than 10 days or as approved by the Supervisor.

IX.1.1.f MATERIALS FOR SHUTTERING

Shuttering shall be made from good quality timber, free from loose knots, shakes and warped surfaces. Timber for shuttering shall not be less than 19 mm in thickness, and the board faces in contact with concrete and the board edges shall be planed smooth and joints shall be tongued and grooved. Shutters used to have fair faced concrete shall be appropriate for this purpose.

Alternatively, with the approval of the Supervisor, shuttering may be made from:

1. Metal with accurately aligned and close fitting joints;
2. Plywood or hardboard 5 mm in thickness supported by close boarded timber;
3. Plywood not less than 17.5 mm in thickness. The plywood or hardboard shall be resistant to deterioration by water, and shall be fixed and jointed in such a manner as to give a perfectly smooth and even finish to the concrete;
4. Plastic with accurately aligned and close fitting joints, sufficiently supported by close boarded timber.

IX.1.1.g REMOVAL OF SHUTTERS

Shutters shall be removed only with the permission of the Supervisor and under skilled supervision of a competent foreman and in such a manner as will not cause any damage to the concrete.

Shutters shall not be removed before the concrete is sufficiently set and hardened.

The minimum periods which shall elapse between the placing of the concrete and the removal of the shutters for the various parts of the structures cast in-situ shall be in any case not less than the period stated in DIN 1045-1. Should there be variations in site temperature and depending on the curing conditions, the Supervisor may, at his discretion, extend the period

At all times the Contractor shall delay the removal of the shutter if in the opinion of the Supervisor the concrete contained therein has not attained sufficient hardness.

IX.1.1.h REINFORCEMENT

Reinforcement shall be performed according to the reinforcement details given in the project. While assembling, the necessary measures shall be taken to avoid deformation of the structural elements and concreting process.

Steel works for all reinforced concrete structures and metal components, that are to be produced in site, shall comply with the local regulation requirements. It should be rust free and in sizes and shapes according to the drawing specifications and technical standards.

Reinforcement quality shall be of BSt500s class for bars and Q-503 class for reinforcement meshes. Note: Reinforcement bars and meshes shall be tested at a licensed laboratory of building materials at the contractor's expenses.

XI.1.2 STEEL WORKS

Steel Works shall be carried by highly skilled workmen and specialist foremen who shall have matured enough experience to construct steel structures and shall be able to mount the metal to their shape, line, grade and hand over final product of high quality in accordance with design, and specifications, fully acceptable to the Supervisor and Contracting Authority.

IX.1.3.a.1 REFERENCE STANDARDS

- EN 10021 - Steel and iron products, General technical conditions for supply
- EN 10025:2004 - Structural steel standard
- EN 10219 - Cold formed welded structural hollow sections
- EN 25817:1993 - Arc-welded joints in steel—Guidance on quality levels for imperfections
- EN 287-1 - Qualification test of welders. Fusion welding. Steels
- EN 288-2—Specification and approval of welding procedures for metal materials. Welding procedures specification for arc welding
- EN 12062 - Non-destructive examination of welds —General rules for metal materials
- EN 970 - Non-destructive examination of fusion welds - Visual examination
- EN 12944 - Paints and varnishes — Corrosion protection of steel structures by protective paint systems
- ISO 4016 - Bolts with hexagonal heads partially threaded type
- ISO 4033 - Hexagonal nuts type A and B.

IX.1.3.b MATERIAL

Primary STEEL structure, where applicable, shall be steel construction made of structural steel profiles according EN 10219, and with dimensions as designed. Structural design has been performed according to Eurocode 3 standards for steel structures. The steel classification shall be structural steel S460, according to Eurocode 3.

Materials specified in the design and/or material as directed by the Supervisor shall be used. All materials used shall have a quality certificate issued by the Manufacturer regarding chemical content, characteristics and mechanical tests according to the standards in force.

IX.1.3.c WELDING

Where applicable the Contractor shall produce shop drawings showing in detail the elements of structure which shall be welded. The shop drawings shall be drawn in due consideration of designers instructions and details shown on the drawings. The Contractor shall provide guidelines for welding complying with the specifications EN 288-2 for all steel elements.

IX.1.3.d TECHNICAL DOCUMENTATION BY THE MANUFACTURER

Where applicable the above guidelines shall be submitted to the Supervisor for his approval prior to start the assembling of the structure. The Contractor shall be required to provide the Supervisor the following documents in addition to welding guidelines:

- material certificates: conformity of material with the mill documents, marking, identification (e.g. heat number, grade)
- programme for quality control;
- Indications regarding pre-assembling in the factory, storage, marking and assembling for transport, as well as loading schemes in transport devices.

IX.1.3.e ANCHORING AND BOLTING

The bolted connections of the steel structure joints shall comply with European Standards (EN) and design specifications as per the provided design drawings and structural calculations. All materials, bolts, nuts, and washers must conform to the relevant EN standards and be suitable for the structural loads and environmental conditions of the project.

The steel Structure shall be bolted to steel anchors placed into the reinforced concrete structure, as shown on the drawings. The anchors shall be made of steel S235. The anchor treads shall be according to DIN 931 for regular bolts or DIN 6914 for High Strength bolts.

All bolted connections must be executed in accordance with the following EN standards:

EN 1090-2: Execution of steel structures and aluminum structures – Part 2: Technical requirements for steel structures

EN 1993-1-8 (Eurocode 3): Design of steel structures – Part 1-8: Design of joints EN 14399: High-strength structural bolting assemblies for preloaded bolts

EN 15048: Non-preloaded structural bolting assemblies

EN ISO 898-1: Mechanical properties of fasteners made of carbon steel and alloy steel EN ISO 10684: Zinc coating for corrosion protection

Bolts, Nuts, and Washers Bolt Type:

Non-preloaded Bolts: Standard structural bolts as per EN 15048 Bolt Material and Strength Class:

Non-preloaded Bolts: Class 4.6 or 5.6 as per design requirements

Nut Specification: Must comply with EN 14399-3 for preloaded bolts and EN 15048 for non- preloaded bolts

Washer Specification:

EN 14399-6 for preloaded assemblies

EN ISO 7091 or EN ISO 7090 for general applications Corrosion Protection:

Hot-dip galvanized as per EN ISO 10684

Assembly and Installation Requirements

Hole Preparation: Standard hole diameter: 1-2 mm larger than bolt diameter

Bolt Tightening: Hand-tightened and secured according to design

Inspection & Testing: Visual Inspection of bolt alignment, spacing, and tightening

Quality Control & Compliance

All bolted connections shall undergo site inspections and verification to ensure compliance with the design requirements and EN standards

XI.1.3 MASONRY

IX.1.3.f WALLS AND PARTITIONS

Masonry of the inner walls shall be made with hollow clay blocks ('gitter') according to the existing regulations. Control of linearity and perpendicularity shall be carried out before the bricks and clay blocks are laid.

For masonry height, the reference will be level ± 0.00 of the concrete structure. Door and window openings are explained on the joinery schemes and specifications. As the doors are dry mounted system, every door opening shall be higher for the readymade floor thickness and wider according to the door frame. On top of the doors a concrete door beam shall be constructed, reinforced with 4Ø R12, Ø6/20cm bars. \

Mortar

Lime mortar type 25 - with sand (35%porosity) mixed in proportion- cement: lime: sand = 1: 0.5:5.5. 87 l hydrated lime, 206 kg cement (type 300), 1.01 m³ sand.

IX.1.3.g PLASTERING

Plastering of the walls inside the building will be carried out with gypsum plaster (specified on 7.2). All angles will be equipped with the angle profiles and should be smoothly finished in order to avoid injuries. Contractor shall, in cooperation with designers and construction supervisors, decide on the method of fulfilment of this requirement.

XI.1.4 FLOORING

IX.1.4.a CEMENT SCREED AS BASE FOR FLOOR APPLICATION REQUIREMENTS

Leveling screed shall be applied in toilette areas of flooring. Final top surface of different flooring must be equalized. Final top surface shall be cleaned and the dust removed, and it shall be levelled using cement based leveling compound, which should be allowed to dry.

The leveling layer of lightweight porous concrete on the floors of the building above acoustic/thermal insulation and other pipes with min. 50 mm thickness, as in the project, with cement mortar 1: 3. The cement mortar should be semi-dry (with as little water as possible). In the price should be calculate the reinforcement with O4 / 15 cm steel mesh.

- Works shall be commenced if the ambient temperature in work area is at least 10°C and rising.
- The ambient temperature shall be above 10°C while work is in progress and for at least 3 days after its completion.
- Use of adhesives in unventilated areas is forbidden.

IX.1.4.b EPOXY COAT FLOORING

Its built up and installation of epoxy coat flooring on specified floor areas, as in the design, with these layers

~ 3 mm thick; Primer epoxy, Coat of epoxy on two layers and quartz sand o 0.08-0.25 and decorative Color Chips.

The coat shall be:

- Low viscosity
- Good penetration ability
- High bond strength
- Easy application
- Short waiting times
- Multi-purpose Technical Specifications

COMPRESSIVE STRENGTH

- Mortar: ~ 55N/mm² (30 days / +23°C / 50% r.h.) FLEXURAL STRENGTH:

- Mortar: ~ 15N/mm² (30 days / +23°C / 50% r.h.) Mortar screed: SR-156 mixed 1:10 with the suitable sand mixture, mentioned below.

BOND STRENGTH:

> 1.5N/mm² (failure in concrete) (EN 4624)

In the price shall be included preparation of the floor, cleaning and together with Aluminum skirting of the floors/rooms, as per design. The material used shall be of high quality and produced by appropriate manufacturer and the working conditions, application equipment etc. shall all be strictly in accordance to the manufacturer's instructions.

IX.1.4.c OAK WOOD PARQUET FLOORING

The work includes the supply, installation, and finishing of high-quality oak wood parquet flooring, ensuring durability, aesthetic appeal, and compliance with industry standards. The parquet shall be suitable for interior applications in residential, commercial, or institutional buildings.

Material Specifications:

Wood Type: Oak (*Quercus* spp.)

Moisture Content: 8-12% at the time of installation

Wood Grade: Select or Natural (as per project requirements)

Surface Treatment: Factory-finished (UV-lacquered, oiled, or unfinished for on-site finishing)

Dimensions & Construction:

Solid Oak Parquet:

Thickness: 18-22 mm

Width: 70-120 mm

Length: 300-1200 mm Engineered Oak Parquet:

Top Layer: 3-6 mm solid oak veneer Core: Plywood or HDF

Total Thickness: 12-16 mm Width: 120-220 mm

Length: 600-2200 mm

Surface Finish Options:

Lacquered: UV-cured for high durability and easy maintenance Oiled: Natural oil finish for a warm, authentic look

Installation Method

Subfloor Preparation: Level, clean, dry, and free from moisture (max 2% humidity for cement screeds)

Installation System:

Floating System (for engineered parquet with click-lock or tongue & groove) Glue-Down (recommended for both solid and engineered wood for stability) Expansion Joints: 10-15 mm gap around perimeter

XI.1.5 CERAMIC FLOOR AND WALL TILES

IX.1.5.a Floor:

- Unglazed ceramic tile: first class, abrasion resistant to PE1 IV.
- Nominal Facial Dimensions: 400x400x8 mm or as per Supervisor instructions
- Provided in the following areas: sanitary areas, as per detail design

IX.1.5.b Wall:

- Ceramic glazed wall tiles: first class, finish with straight edges
- abrasion resistant to PE1 IV
- Nominal Facial Dimensions: 200x400x8 or as per Supervisor Instructions
- Provided in the following areas: sanitary areas and wash stand walls, kitchen, as per detail design Supply and installation of ceramic tiles (first class) with adhesive on the floor and walls of the toilets, shower and kitchen, and other rooms, see the project. The placement of tiles should be made without working "joint" (1 mm permissible joint), the type and color of tiles is determined according to the supervisors/designers request. In the price shall be calculate placement of tiles on the wall with 100 mm height along the wall, as skirting The ceramic tiles shall be not slippery. The material used shall be of high quality and application equipment etc. shall all be strictly in accordance to the manufacturer's instructions.

IX.1.5.c NATURAL GRANITE FOR STAIRS

The work includes the supply, cutting, finishing, and installation of natural granite for indoor or outdoor staircases. The granite shall be of high quality, durable, and resistant to wear, weather, and chemical agents.

Material Specifications Natural Granite

Color: To be selected from available shades (Grey, Black, Beige, Red, etc.) Finish:

- Polished (for interior use)
- Flamed / Bush-hammered / Honed (for exterior or slip-resistant surfaces) Density: Approx. 2.6 – 2.8 g/cm³

Water Absorption: $\leq 0.5\%$ Compressive Strength: 100-200 MPa Flexural Strength: 10-20 MPa Thickness

Treads:

Thickness: 30 mm Risers:

Thickness: 20mm

Skirting (if required): 100-150 mm high, 20 mm thick

Edge Profiles

Straight / Square Edge (standard)

Installation Method

Substrate Preparation: Surface must be clean, dry, and structurally sound Fixing Method:

Cement Mortar (1:3 ratio) or Tile Adhesive (for interior installations)

Mechanical Anchoring with Stainless Steel Clamps (for large or exterior staircases)

XI.1.6 JOINERY - DOORS, WINDOWS AND ASSEMBLIES

General

The present activity mainly refers but it is not limited to supply, fixing and handing of doors, windows and assemblies, complete and in accordance with Detailed Design and Supervisor instructions.

The schedule of the doors, windows and assemblies presented in Detailed Design shall be the guide for this item, but all the measurements shall be re-checked on site before the start of manufacturing.

Aluminium work and glazing shall be carried out in strict accordance with the requirements of the applicable Building Code requirements and applicable EU standards.

IX.1.5.a DOORS

IX.1.5.a.1 INTERNAL WOODEN DOORS

These doors shall be flat wooden doors with high resistance level to mechanical and physical influences.

The installation of interior doors for the classrooms and other spaces made Wood Veneered with 4mm thick plywood on both sides with light wood color/structure, hollow core filled with the tubulars perforated chipboard core t=40mm. With flat surfaces and good physical and mechanical properties and the doors with glazing should be with FLOT laminated 4+4 mm according to the schemes. Doors should have Laminated Wood Frame and lining, min; t=40mm and acoustic performance: >45 dB, and should be equipped with a suitable opening and closing mechanism.

Dimensions and colour as specified in the drawings and BoQ.

IX.1.5.a.2 PVC DOORS for bathroom

The work includes the supply, delivery, and installation of PVC doors for bathrooms. The doors must be water-resistant, durable, and low-maintenance, suitable for humid environments, and designed for residential, commercial, or public restroom applications.

Material Specifications

Material: Rigid Polyvinyl Chloride (PVC)

Door Type: Solid PVC or Honeycomb PVC Core Surface Finish: Smooth, Textured,

Water Resistance: 100% waterproof Dimensions & Thickness

Standard Door Sizes:

Height: 2000 - 2100 mm Width: (as per project) Thickness: 30 - 40 mm

Frame Thickness: 50 - 70 mm

4. Door Frame & Accessories

Frame Material: PVC or Aluminum-reinforced PVC Frame Profile: Minimum 50 mm width, chamfered edges Sealing: Rubber gasket for water and sound insulation Threshold: Optional, based on project requirements

IX.1.5.a.3 FIRE DOORS

Fire door shall be, 60 minutes fire rated and manufactured by appropriate manufacturer. They shall be installed strictly in accordance with the manufacturer's instructions

Single wing fire doors shall be galvanised steel door sheet door leaf with insulating-material core, without bottom frame, total thickness 60mm.

Corner frame made of galvanised steel, with joints for on-site assembly and brackets to be adequately bolted into walls, if the walls are not deemed to be strong enough to resist closing

forces on the door, the Contractor shall strengthen the frame with additional steel supported from the concrete slabs.

Doors shall have the following features:

- Lock complete with cylinder bore and keyhole for patent keys.
- 2 hinges: one hinge with self-closing spring, one ball-bearing hinge with screws for the vertical adjustment.
- Strengthening plates inside door leaf for fastening door closer and emergency handle if required.
- Thermo expanding gasket inserted in appropriate cavity in frame.
- Identification plate in door edge
- Painted with epoxy polyester oven-backed powder paint with anti-scratch goffered finish-light pastel turquoise for door leaf (NCS4020-B50G), and a darker frame shade for the frame (NCS5020-B50G).
- The core of the leaf is insulated with polyurethane foam to provide stability of the door leaf.
- These doors shall have automatic closers which provide slower but stronger closing forces in the last 5 degrees of closure, weather strip, cylinders, lock 3 closing point.
- The doors shall be equipped with electro magnet door holders to close the door after the smoke detector system detects the smoke.

IX.1.5.b EXTERNAL ALUMINIUM WINDOWS SYSTEM

Highly thermally insulated aluminium window system shall be with thermal bridge protection. Windows shall be double glazed with aluminium frames to match the standards of BS 1474:1987 or equivalent European Standard Finish to Aluminium: polyester Powder coated Applied to a thickness of 60 microns in accordance with DIN 17611 or equivalent European Standard.

Profile basic depths:

Outer frame, mullion, transom 70 mm Vent frame 80 mm

Profile face widths:

Outer frame, bottom 104 mm

Outer frame, side and top 79 mm

Thermal transmittance $U_f=1.5 \text{ W/m}^2\text{K}$ in accordance with DIN 4108; Specification for aluminium and alloy for the window frames and the complete window.

General characteristics:

Chemical content of the profile: AlMgSi0.5 F22 in accordance with EN AW – 6060. Acoustic insulation in accordance with DIN 4109. ($R_w=48 \text{ dB}$)

Watertightness in accordance with EN 12208 (OZ- class 9A,8+5 min) Air permeability in accordance with EN 12207 (OZ-class 4, 3 m^3/hm^2) Resistance to wind load in accordance with EN 12210 (OZ-class C5/B5) Burglar resistance in accordance with DIN V ENV 1627 (WK2)

Gaskets from EPDM in accordance with DIN 7863 (-30 till +80) degrees C° Quality control in accordance with DIN EN ISO 9001

Colour shall be RAL 7015 for Hinges shall be to BS7479:1990 or equivalent European

Standard corrosive resistant tested. Glazing Units

Double glazed unit: 6+16+6mm with the following characteristics shall be applied, Glazing shall match the following characteristics:

Glass Substrate	Extra clear Colour	Neutral
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Visible Light (EN 410-2011)

Transmission 74%

Reflection Outside 16%

Reflection Inside 16%

Thermal Properties (EN 673-2011) U-value [$\text{W}/(\text{m}^2\text{K})$] $U_g=0,6$

Solar Energy (EN 410-2011)

Solar factor (g) - EN41053%

Shading Coefficient 0,62

UV Transmittance 17%

All extruded sections, paint finishes, accessories (locks, handles, hinges etc.) shall be supplied by BSI/ISO 9002 or equivalent European Standard, registered companies.

IX.1.5.c EXTERNAL ALUMINIUM DOORS

Highly thermally insulated aluminium door system shall be aligned with the aluminum windows system. The basic depth of the profiles shall be 75 mm. they are to be operated electrically as sliding doors

General characteristics:

Chemical content of the profile: AlMgSi0,5 F22 in accordance with EN AW - 6060. Thermal transmittance: $U_f=1,20-1,80 \text{ W/m}^2\text{K}$ in accordance with DIN EN ISO 10077-2. Acoustic insulation in accordance with DIN 4109.

Water tightness in accordance with EN 12154 (KI. RE 1200). Air permeability in accordance with EN 12152 (KI. AE).

Resistance to wind load in accordance with EN 12179 - 4.

Burglar resistance in accordance with DIN ENV 1627 (WK2) and DIN V 18054 (EF1). Gaskets from EPDM in accordance with DIN 7863 (-30 till +80) degrees C°

Glass secured from accidental dislocation in accordance with DIN EN 12600 and TRAV (cat. A).

Quality control in accordance with DIN EN ISO 9001 Design features:

Internal and external flush-fitted door constructions with 5 mm shadow joint on both sides; with 11 mm shadow joint for double-leaf panic doors. The thermal breaking split insulating bars are fitted with foam insulation for high thermal insulation. The door leaf profiles are fitted with thermal breaking split insulating bars. The door leaves must have a four-sided

mitre-cut leaf profile.

The system must be fitted with square glazing beads. For increased thermal insulation, glazing gaskets with fins must be used.

The bottom door sill must be fitted with an aluminium/plastic rebate threshold, height 20 mm, and a gasket system for sealing at a test pressure of up to 150 PA in accordance with DIN EN 12208.

Glazing:

Glazing shall consist of insulating glass 6+16+6mm Low-E glass

Accessories: hardware, fastenings, clips, fins, anchors, glazing beads, and other appurtenances necessary for complete installation and proper operation.

Fasteners: use fasteners as standard with the doors manufacturer, trim, and accessories. Drips and weep holes to return water to the outside.

All extruded sections, paint finishes, accessories (locks, handles, hinges etc.) shall be supplied by BSI/ISO 9002 or equivalent European Standard, registered companies.

XI.1.7 FAÇADE PANELLING High-Pressure Laminate (HPL) Facade Panels

IX.1.7.a General Description

The work includes the supply, delivery, and installation of High-Pressure Laminate (HPL) facade panels for external cladding applications. The panels must be weather-resistant, UV-stable, impact-resistant, and non-combustible, suitable for ventilated facades or direct fixing on substructures.

IX.1.7.b Material Specifications

Base Material: High-Pressure Laminate (HPL) composed of multiple layers of kraft paper impregnated with thermosetting resins, compressed under high pressure and temperature. Surface Finish: Decorative resin-impregnated layer with UV protection.

Core Type: Compact, solid-core for high durability and dimensional stability. Thickness: 6 mm – 12 mm (as per project requirements).

Standard Panel Sizes:

Width: 1200 - 1860 mm

Length: 2400 - 3660 mm

Density: $\geq 1350 \text{ kg/m}^3$

Thermal Conductivity: $\leq 0.3 \text{ W/mK}$

Moisture Absorption: $< 3\%$

3. Additional Components

3.11 Diffusive Foil

Material: Water vapor-permeable, windproof, and UV-resistant membrane.

Thickness & Content: As per the manufacturer's recommendations for the selected HPL panel system.

Purpose: Enhances facade ventilation and prevents moisture accumulation inside the insulation layer.

IX.1.7.c Thermal Insulation Layer

Material: High-density stone wool insulation. Thickness: 80 mm

Density: 75 kg/m^3

Thermal Conductivity Coefficient: 0.035 W/mK

Fire Reaction Class: A1 (non-combustible, highest fire resistance classification).

Installation: Fixed between aluminum substructure elements to ensure continuous insulation without thermal bridges.

IX.1.7.d Performance Characteristics

Weather Resistance: Suitable for extreme climatic conditions, UV-resistant.

Fire Resistance: Minimum B-s1, d0 (EN 13501-1) or A2-s1, d0 for high fire-rated projects.

Impact Resistance: $\geq 10 \text{ kJ/m}^2$ (ISO 178).

Scratch Resistance: $\geq 3\text{N}$ force resistance (EN 438-2).

Chemical Resistance: Resistant to common cleaning agents, acids, and solvents. Color Stability: No significant color change after prolonged sun exposure.

Anti-Graffiti Coating: Optional, for easy cleaning.

IX.1.7.e Substructure & Fixing System

Substructure: Aluminum profiles (T and L sections) or galvanized steel brackets for ventilated facades.

Fixing Options:

Visible Fixing: Stainless steel screws/rivets with color-matched heads. Concealed Fixing: Mechanical clips or adhesive bonding system.

Expansion Joints: Required for thermal expansion, minimum 8 mm between panels. Ventilation Gap: 20-40 mm for optimal air circulation behind panels.

IX.1.7.f Installation Method

Alignment & Leveling: Panels to be installed on an adjustable substructure to ensure flatness.

Weatherproofing: Joints sealed with EPDM gaskets or UV-stable sealant.

Panel Cutting & Edge Finishing: Machined edges with smooth finishing, chamfered or rounded as per requirement.

Diffusive Foil Installation: Installed behind HPL panels, ensuring overlap and proper adhesion to the substructure.

Stone Wool Insulation: Installed securely between substructure brackets, ensuring no gaps or compression loss.

IX.1.7.g Durability & Maintenance

Expected Lifespan: 20-30 years under normal conditions.

Maintenance:

Easy to clean with mild detergent and water.

Regular inspection for fixing integrity and panel condition.

IX.1.7.h Warranty & Compliance

Minimum Warranty: 10 years against delamination, fading, and structural defects. Compliance Standards:

EN 438-6 (High-Pressure Decorative Laminates for Exterior Use). EN 13501-1 (Fire classification of construction materials).

ISO 178 (Flexural strength test for HPL).

ISO 10456 (Thermal properties of building materials).

EN 13162 (Specification for mineral wool insulation products)

XI.1.8 ALUMINIUM AND GLASS ENCLOSURE

IX.1.8.a General Description

This specification covers the design, supply, fabrication, and installation of an aluminium and glass enclosure for an external terrace. The structure shall be weather-resistant, soundproof, and thermally insulated, with automated operability for the roof and sliding glass walls.

IX.1.8.b Scope of Work

The work includes:

Fabrication and installation of an aluminium and glass structure. Supply and installation of sliding glass walls with aluminum framing.

Roof structure with static thermopane glass and an electrically operable ceiling system. Integration of an automatic mechanism with remote control for operable elements.

Complete provision of materials, structural works, and finishing. Coordination with the supervising body or owner before commencement.

IX.1.8.c Technical Specifications

IX.1.8.c.1 Structure & Framework

Material: Aluminium profiles (6060-T6 alloy or equivalent, corrosion-resistant).

Finish: Powder-coated or anodized finish (minimum 60-80 microns) in a specified RAL color. Wall Height: 3.90 m, sloping down to 2.80 m (as per project).

Connections & Fixings:

Stainless steel fasteners (AISI 304 or 316).

Structural silicone or EPDM rubber gaskets for airtightness.

IX.1.8.c.2 Roof System

Type: Combination of static thermopane glass and an operable ceiling system. Glass Specification:

Double-glazed tempered glass, 6+12+6 mm (or as per project requirements).

Low-emissivity (Low-E) coating for thermal insulation.

Solar control treatment to reduce heat gain.

Safety laminated glass to prevent breakage hazards. Operable Roof Mechanism:

Electrically controlled opening panels (sliding or retractable). Remote control operation with integrated safety sensors.

Motorized system with IP65-rated weatherproofing.

IX.1.8.c.3 Glass Walls & Sliding Doors

Type: Sliding glass panels with aluminum profiles. Glass Specification:

10 mm tempered safety glass (single-layer) or double-glazed for better insulation. Transparent or tinted (as per project requirements).

Sliding Mechanism:

Heavy-duty roller system with smooth operation. Soft-close function for safety.

Weather-sealed rails to prevent air and water infiltration. Door System:

Sliding or pivot doors integrated into the system. Locking mechanism with stainless steel handles.

IX.1.8.c.4 Insulation & Sealing

Thermal Insulation:

Polyamide thermal breaks in aluminum profiles.

Double-glazed glass with argon filling for heat efficiency. Sealing Components:

EPDM gaskets for airtightness. Silicone sealants for waterproofing.

IX.1.8.c.5 Drainage & Ventilation

Integrated drainage channels for rainwater runoff. Ventilation openings if required by local building codes.

IX.1.8.c.6 Electrical & Automation System

Control System:

Wireless remote control for the operable ceiling. Manual override in case of power failure.

Power Supply:

230V/50Hz (standard electrical connection).

Low-power consumption motors with safety sensors.

IX.1.8.d Performance Requirements

Wind Load Resistance: Up to 120 km/h wind speeds. Waterproofing: No leaks under heavy rain conditions. Thermal Performance: U-value $\leq 1.8 \text{ W/m}^2\text{K}$.

Sound Insulation: Up to 35 dB reduction.

Fire Resistance: Non-combustible aluminum and tempered glass.

XI.2 Water and Sanitation Works

Reference: EN 10240; EN 1074-1; EN 1074-2; EN 1092-2; EN 1213

XI.2.1 General

This section refers, but is not limited, to the performance of the toilets used by the facility users. All sanitary equipment and accessories shall be robust and suitable for public use. The Contractor shall provide stainless steel: toilet role holders, hand drying paper towel holders, handrails, shelves.

Mirrors shall be set into the tiling.

All connections to existing water mains shall be made good.

XI.2.2 Quality Control

All materials shall be manufactured by a factory possessing an established and approved quality assurance/quality control scheme complying with the requirements of ISO9000 standard. However, local manufacturers' products must be continuously tested for compliance with the relevant standard at an approved independent laboratory. The local manufacturer shall have a satisfactory, functioning and fully documented quality assurance procedure.

Unless otherwise specifically stated, all pipes, fittings, sanitary ware, accessories, mixer taps, pumps and related materials, etc. shall be marked with proper identification as per the relevant standard. A full range of samples shall be submitted for the purpose of approval. Catalogues and product technical data shall be submitted along with the material for approval certificate.

XI.2.3 Waste Pipes, Fittings and Jointing Material

Waste pipes and fittings shall be Modified UPVC (MUPVC) complying with BS 5255. The pipes shall be jointed with solvent cement complying with BS 6209.

Trap Floor gullies shall be manufactured from MUPVC complying with the requirements of BS5255. The minimum seal depth shall be 50mm.

All pipes and fittings shall have proper identification marks such as manufacturer's identification, number of relevant standard, material code, nominal size and third party quality license mark.

XI.2.4 Polyethylene Water Pipes & Fittings

IX.2.4.a General

Where specified, the plastic piping plumbing system shall consist of plastic pipes running through corrugated plastic polyethylene conduits and brass fittings. The system is intended to facilitate replacement of inner plastic pipes by pulling them whenever necessary. The full system shall be manufactured by an approved manufacturer having a quality management scheme certified by a third party body. The system shall be certified by a third party recognized body for compliance with international standards and for suitability for use with drinking water. The plumbing system shall comply with the requirements of DIN1988 and EN12318-5.

IX.2.4.b Pipes

Pipes shall be made from high density polyethylene improved by cross linking. The pipes (known

commercially as PEX) shall meet the requirements of DIN 16892/16893. The pipe shall be capable of withstanding the local water quality conditions and carrying drinking water at a temperature range from 10°C to 95°C, and up to 100°C as a short term temperature during normal working pressure (up to 8 bar).

Adequate information's about the moulding material shall be submitted to prove the compliance with DIN16776 standard.

The manufacturer shall ensure, and demonstrate when required, that the minimum degree of cross linking has been achieved to enhance the long term properties. All pipes delivered to site must bear the following marking:

- the manufacturer's name or trade mark – third party certifying bodies' marks
- the outside diameter and the wall thickness – the manufacturer's standard number
- the pressure rating
- manufacturing date and machine number

IX.2.4.c Pipe Sleeve (Conduit)

The conduit used for the pipes must be of adequately corrugated type to ease the movement of the pipes. The conduit shall be made of polyethylene or any other approved suitable material. The conduit shall be available in at least two colours to distinguish between hot and cold water pipes.

IX.2.4.d Manifold

Each manifold shall consist of the following:

1. A manifold cabinet of an inert plastic material that is suitable for wall installation. The cabinet shall have a plastic cover. The manifold cabinet shall be of adequate size to accommodate the manifold and other materials necessary for the system.
2. Water distribution manifolds made of brass, and
3. Brass interception valves connected to the manifold. Slow closing valves shall be used when necessary to reduce the effect of water hammering. Valves are to comply with BS5154.

All brass items shall comply with distribution fittings requirements.

IX.2.4.e Distribution Fittings:

Distribution fittings shall be brass according to DIN1982 and EN1254.

XI.2.5 Application requirements

Notice: all pipes shall be buried or recessed under plaster. No faced pipes shall be admitted. Indoor pipes

- Provide plastic pipes dimensioned according to the Detailed Design connected to vertical main lines (connection of horizontal-buried pipes),

Installation

- Provide adjustable type galvanized steel support rods, except when specified or indicated otherwise.

Toilet fittings

This section refers, but is not limited, to the applied quality:

- First class standard ceramic sitting pan, Simplon type, provided with good quality body, and flush tank fitting the same pan style.
- First class ceramic wash basin, full pedestal type, provided with plastic siphoned drain pipe
- Mixing faucet connected to both fresh and hot sanitary water system, brass body, .”connection, chromium plated Wall mounted decorative faucet
- Nickel coated decorative faucet – cold water only shall be installed on each consuming point, e.g. hand washing.
- The tap shall have easy open/close command, and rotary outlet.
- Decorative cover shall be installed on the wall to cover the hole in the tile.
- Framed mirror dimensions 50 x 50 cm shall be fixed within ceramic tiles above wash basins.

Toilet fixtures of heavy duty stainless steel:

- toilet tissue dispenser (metal flecked);
- folded hand towel dispensers (metal flecked);
- hand cleanser dispenser 1l cassette (metal flecked);
- trash bin with rotary cover.
- toilet brush

Floor drain, solid P.V.C. trap, provided with:

- Siphon system and secure stainless steel grill on top of it, removable for cleaning.
- All sanitary fittings shall conform to the same style.
- Marking parts and Materials

XI.3 Electrical Works

XI.3.1 SOLAR SYSTEM

IX.3.1.a . General Description

The solar system consists of high-efficiency photovoltaic (PV) panels, a supporting steel structure, an inverter, and necessary electrical components to ensure safe and efficient operation.

IX.3.1.b Components & Specifications

IX.3.1.b.1 Photovoltaic Panels

Type: Monocrystalline Photovoltaic Panels Power Output: 410 Wp per panel Efficiency: $\geq 20.97\%$

Origin: Made in Europe

Dimensions: 1724 mm x 1134 mm x 35 mm (+/-2 mm) Weight: 22 kg

Encapsulation:

High-transparency tempered glass EVA encapsulant

Back sheet with high weather resistance Frame: Aluminium alloy (corrosion-resistant) Operating Temperature Range: -40°C to $+85^{\circ}\text{C}$ Maximum System Voltage: 1,500V DC

Junction Box: IP68-rated with bypass diodes for protection Connectors: MC4-compatible

IX.3.1.b.2 Steel Structure with Grounding

Material: Galvanized steel (minimum Z275 coating for corrosion protection) Wind Resistance: Designed for up to 150 km/h wind speed

Inclination Angle: Optimized for maximum solar energy production based on project location Grounding: Fully integrated earthing system to ensure safety

IX.3.1.b.3 M-Connector for Solar Panel Connection

Type: MC4-compatible multi-branch connector

IP Rating: IP67 for waterproof and dustproof performance Material: UV-resistant thermoplastic

Operating Temperature: -40°C to $+85^{\circ}\text{C}$ Maximum Voltage: 1,500V DC

IX.3.1.b.4 Protection System (Fuses & Overvoltage Protection)

Purpose: Protect the PV system from electrical faults such as overvoltage, short circuits, and overloads Components:

DC fuses: 1000V–1500V, with fast-acting protection Surge Protection Devices (SPD): Class II, 1000V DC rated

DC Disconnect Switch: Integrated for emergency shutdown

AC Protection: Circuit breakers and residual current device (RCD) for safety

IX.3.1.b.5 Inverter (Effekta AX-M2 5000-48)

Type: Hybrid solar inverter Power Capacity: 5,000W Input Voltage (DC): 48V Efficiency: $\geq 96\%$ Waveform: Pure sine wave

Protections: Overvoltage, short circuit, overload, overheating Communication Interface: RS232 / USB / Wi-Fi (optional) Cooling System: Active cooling with fan

Operating Temperature: -10°C to +55°C

IX.3.1.b.6 DC & AC Cabling

DC Cables:

Solar PV DC Cable, 4 mm² / 6 mm²

UV and weather-resistant (TÜV certified) Double insulation for safety

AC Cables:

Minimum 4 mm² copper cable

Fire-resistant insulation (IEC 60332-1)

Proper grounding and shielding for electrical safety

IX.3.1.c Performance Requirements

Expected Lifespan: ≥ 25 years

Minimum Degradation Rate: ≤ 0.5% per year Operating Temperature Range: -40°C to +85°C

Certification & Standards Compliance:

IEC 61215, IEC 61730 (PV modules)

IEC 62109 (Inverter)

IEC 60364 (Electrical Installation)

4. Installation & Quality Control

Installation as per manufacturer guidelines and local electrical regulations

IX.3.1.d Final Inspection & Testing:

Voltage & current verification

Insulation resistance testing Grounding continuity check

Inverter operation & efficiency check

XI.4 MECHANICAL WORKS

XI.4.1 ELEVATOR

General Description

The work includes the supply, installation, and commissioning of a panoramic elevator designed for 10 people / 800 kg with accessibility features for persons with limited abilities. The elevator will be installed in a concrete shaft, and all necessary electrical works required for full operation are included.

The system is a machine-room-less (MRL) electric lift with the following characteristics: Capacity: Q = 630 kg (8 people)

Speed: 1.0 m/s

Control System: Simplex microprocessor Travel Height: H = 14.25m with 5 substations

Door System: Fully automatic doors at each floor

Structure: Reinforced glass columns and corners, with a glass middle section Roof: Cage structure calculated with a cover including insulating layers Safety & Compliance: Installation according to supervisory team approval

Scope of Work

The contractor shall undertake the following:

Supply & Installation of all elevator components, including:

Cabin: Stainless steel (INOX) walls and ceiling, PVC floor, integrated control panel, and ventilation fan.

Driving Motor: VVVF geared motor (6.0-7.3 kW, 3x380/220 Hz, 50V).

Rails & Counterweights: Installed with high-strength T 90/B and T 50/B profiles.

Speed Limiter & Safety Features: Two-way action speed limiter (0.7–1.2 m/s), shock absorbers. Doors & Access: Automatic glass/stainless steel doors at all substations, with central opening. Electronic Controls: Co-controller, inverter, emergency UPS, and operational buttons.

Cabling & Electrical Works: Full integration, including flat cables (25m), NYAF 0.75mm cables, and required wiring.

Testing & Commissioning, ensuring full compliance with operational and safety standards. Technical Acceptance & Certification of the elevator system.

END