



# TECHNICAL SPECIFICATIONS THE ARCHEOLOGICAL MUSEUM OF DURRËS





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*VERIFY ALL DIMENSIONS AND CONDITIONS ON SITE AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH THE IMPLEMENTATION WORKS.*





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## PREAMBLE

The information provided herein are drawn up to specify works and installations to exactly match the standards required to achieve the objectives of the project.

The Contractor shall certify the conformity of offered products with the specifications as requested below and shall furnish the Contracting Authority and the Supervisor with further certifications that prove the conformity of the goods with the standards as required.

General comprehension shall be achieved for the following:

Technical Specifications, Tables in the Technical Specifications or in the Bill of Quantity, Photos or Drawings do not imply a specific product or a specific manufacturer.

Works, products or installations proposed by the contractor which represent a higher degree of standard or a newer version shall be accepted whenever proven by the contractor.

Tables and enumerative descriptions in these specifications indicate a range for the contractor to propose the respective product; the above mentioned tolerances shall apply unless explicitly restricted.

The approval of an offered product is given by the Supervisor at building site only after presentation of an acceptable sample of each type.

All supplies, materials and products purchased must originate from an EU member state, a country that is a beneficiary of the European Neighbourhood and Partnership Instrument or a Member State of the European Economic Area or a country which has established reciprocal access to their external assistance with the EU. Please also refer to Article 19, paragraph 5 of the "EC Council Regulation No 1085/2006" (IPA regulations).



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Not every situation can be foreseen, therefore these specifications give an outline to the work and set a standard that is to be met. In cases where local practice overrides these specifications then it is up to the discretion and prudence of the Conservation Architect or Engineer in situ.

There are two technical parts to the project design.

The first pillar is this Technical Specifications Report, ordered as per common conservation trades and it is more oriented toward the materials, standards, and execution of the implementation works.

The second technical pillar is the Technical Report which includes the description of the site's conditions, structural systems and overview of conditions.

They are to be used in combination. They are, as in all complex conservation projects, interconnected and refer to one another as well as the Drawings and Bill of Quantities.

Locally available sizes for all elements described in this document can be used with the permission of the conservation architect or engineer. These documents are intended give an outline and standard of the work to be performed.

It is the responsibility of the contracted party carrying out the conservation works to request clarification to this, or any subsequent document, to the Conservation Architect or Engineer should there be any questions or misinterpretation.

All materials, sizes and installation listed in the drawings and specifications must be submitted to the Conservation Architect or Engineer for approval.

The project design required work interventions are based on these Technical Specifications, Drawings, and the Bill of Quantities. These three documents are linked to give the best possible description of each intervention.

## 1. GENERAL REQUIREMENTS

### 1.1 SCOPE OF WORK

The main objective of the design for this site is to provide the structural consolidation and rehabilitation of the Archeological Museum of Durrës.

The detailed design works include, but are not limited to, Architectural and Structural Works of Conservation.

The intervention on the heritage site consists in the:

- Full conservation, structural stabilization and a full restoration
- Revitalizing the function of the building by identifying the materials and functions of the hammam, to bring a museum of hammam to the public, through the functional internal spaces and the new digital technologies.



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All of these measures are outlined graphically in the **Drawings** and fiscally in the **Bill of Quantities**. The Bill of Quantities includes a basic outline for each section.

**Note:** If there are any elements that cause structural instability that are uncovered or observed during the works then these are also included in the scope of work.

If these areas are found, then they must be brought to the immediate attention of the conservation architect or engineer.

The intent of these documents (General Conditions, Technical Specifications, Drawings, and Bill of Quantity), along with other investigations and preliminary reports is to describe the work that the contractor will undertake. The contractor shall perform all of the work specified in these documents in good faith and execute the contract and such additional, extra, collateral and incidental work as required and necessary for the proper execution and completion of the work reasonably inferable from the contract. Contractor shall provide and pay for all labour, materials, equipment, tools, temporary water, light, power, transportation, shop drawings, and incidentals and other facilities and services necessary for proper execution and completion of the work, whether or not they are incorporated into the work.

The detailed design reports explain the order of the works as there are many elements that must be stabilized or removed before other work can be conducted. Therefore, the drawings and reports contain details concerning the conservation steps, what must be stabilized and structurally consolidated or removed before other work commence.

However, these priorities do not infringe on the staging and other works that can be prepared off-site or in conjunction with these important factors. It is the responsibility of the contracted party to conduct the works in the most efficient, cost effective, and time saving manner.

## 1.2 UNITS OF MEASUREMENTS

In general, the units of measurements to be used in connection with this contract are metric units of mm, cm, m Km, N (Newton), Mg (1000 kg) and degrees Celsius (Co). Decimal points are written as ",". The units to which the contractor shall refer to for measurements are indicated in the respective Bill of Quantities for each individual item separately.

## 1.3 DISCREPANCIES

Before the contractor begins any work, they shall carefully review the all documents, drawings and specifications, inspect the site, and compare the documents comprising the contract with each other and with any additional information furnished by the Contracting Authority with the objective of discovering any errors, inconsistencies or omissions.

Should any of the above-described errors, discrepancies or omissions be found in the contract or should any discrepancy be found between the contract and the physical conditions at the site or in



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any subsequent drawings or addenda that may be provided thereafter, the contractor shall notify the Contracting Authority in writing, immediately.

Any work done after such discovery, unless authorized in writing by the Contracting Authority will be done at the contractor's expense. The contractor will not be allowed to take advantage of any error, omission, or discrepancy in the contract.

## 1.4 EXECUTION REQUIREMENTS

Particular attention is drawn to the fact that certain works require traditional and / or other professional expertise in conservation design and installation; the Contractor has to consider that the mentioned specifications and subsequent expenses are borne with the Contractor and are thus, to be included in the unit prices.

The Contractor shall in accordance to his own design, also propose and submit a methodology how to implement his design. The design shall be in accordance to the detailed design drawings and the material specified. All design, methodology and purchase shall be approved by the Supervisor. Only especially skilled and licensed technicians shall be authorized to install the system. The contractor shall provide to the Supervisor evidence of the qualifications of the nominated staff before commencement of works.

### 1.4.1 DEGREE OF SKILL, CARE AND DILIGENCE

The contractor shall perform, or cause to be performed, all the work required of it under the terms and conditions of the contract with that degree of skill, care, and diligence normally exercised in performing that type of work in projects of a scope and magnitude comparable to the project. The contractor shall use their best efforts to assure timely and satisfactory completion of the work. The contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the work under the contract, unless the contract gives other specific instructions concerning those matters.

The contractor has an obligation when directed by the Contracting Authority, shall promptly correct, or remove all work identified to be defective or incomplete. The contractor shall bear all costs.

Unauthorized work done without permission from the Contracting Authority as shown on the drawings or specifications will be considered as unauthorized.

### 1.4.2 FAULTY WORKS

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



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#### 1.4.3 MATERIALS

There will be no substitutions of materials on this project without written authorization of the conservation architect or engineer.

The materials shall comply with the specifications and used throughout the work. In the absence of a defined specification then the contractor will submit in writing a report of any required new materials. Testing of all materials including mortar, stone, sand, and other materials shall be conducted and approved by the conservation architect or engineer. All data sheets and materials identification and literature including product description, samples, and test along with the name of the manufacturer will be submitted to the Contracting Authority.

The conservation architect or engineer has the right to inspect any and all materials used to ensure quality and standards, at any time.

#### 1.4.4 PERSONNEL

The Contractor shall provide the name and identification documents of all persons or subcontractors expected to work on the project to ADF prior to commencement of work. If any changes are required, then the Contractor shall submit in writing proposed changes.

#### 1.4.5 INFORMATION TO BE SUPPLIED TO THE SUPERVISOR

The information to be supplied to the Supervisor shall include drawings showing the general arrangement of the temporary offices and any other temporary buildings or structures which he proposes to use, together with details of the constructional plant and temporary works, and all other devices which he proposes to adopt for the construction and completion of the whole of the works and, in addition, details of the labour strength, skilled and unskilled, and supervision arrangements.

#### 1.4.6 APPROVAL BY SUPERVISOR OF METHOD STATEMENTS

The manner and the order in which it is proposed to execute the permanent works as described in the Contractor's method statements is subject to adjustment and approval by the Supervisor, and the Contract price shall be held to include any necessary adjustment required by the Supervisor during the course of the work.

#### 1.4.7 ADDITIONAL WORK

The contractor should submit to the Supervisor every additional work; a detailed drawing and the work should begin only after the Supervisor's approval.



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#### 1.4.8 CONFIRMATION OF SUBMISSIONS

The contractor should sign proposals, details, sketches, accounts, information, materials, test certificate, whenever required by the Supervisor. The Supervisor will accept every submission and if appropriate will be answered to the contractor in accordance to any proper clause of contract conditions. Every submission should be done due to dates agree with the Supervisor and referring to the approved program and necessary time that the Supervisor needs to submit those works.

#### 1.4.9 AS BUILT DRAWINGS

This material should contain the complete set of drawings of the implemented works, including any additional drawings made during work implementation approved by the Supervisor, and the measurement handbook per each work volume.

#### 1.4.10 ROAD CLEANING

Streets adjacent to the site shall be kept clean on a daily basis. The Contractor shall take necessary precautions to prevent excessive spoiling of streets such as wheel washing and covering of open lorries and containers leaving the site.

#### 1.4.11 PROTECTION OF TREES

All trees which are not approved for felling shall be protected against damage during the entire Contract Period using wooden boards strapped around the trunk of the tree extending up to a height of 2m. No trees with a trunk diameter greater than 10 cm measured at 1m above ground shall be felled without prior permission of the relevant authorities and the Supervisor.

### 1.5 HEALTH AND SAFETY

The Contractor shall implement all works in accordance with current European and Albanian Health and Safety at Work Standards.

He shall develop and maintain a proactive approach to safety on site with providing the following:

- A site safety plan
- Nomination of a safety inspector
- Carrying out regular staff safety briefings
- Performing regular safety tours of the site with the Supervisor and
- Maintenance of accident statistics for presentation to the Supervisor each month.



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## 2. SITE CONSTRUCTION

### 2.1 MOBILISATION

It is the contractor's responsibility to become familiar with these documents and contact the Contracting Authority or the conservation architect or engineer should there be any questions, concerns, or discrepancies. It is also the contractor's responsibility to visit the site and become familiar with the unique situations present at the site before beginning the works on the project.

The project is complicated; therefore, the scope / limits is also outlined in this document as well as clearly delineated on the drawings. Should there be any questions before, during, or after the work concerning scope the Contracting Authority must be contacted.

#### 2.1.1 OBTAINING NECESSARY IMPLEMENTATION WORKS PERMITS

It the contractor's responsibilities to obtain the necessary implementation works permits, insurance, bonding, right-of-way, etc. It is also the contractor's responsibility to obtain all the necessary permissions to conduct the work outlined in these General Conditions, Technical Specification, and Drawings. No work shall commence until these permissions are obtained and a copy submitted to the Contracting Authority. It is the contractor's responsibility to obtain all permissions required to execute this scope of work. If the permissions have a time requirement this must also be respected and if reapplication is required, this is also the contractor's responsibility. All expenses for obtaining these permissions are the contractor's responsibility. The contractor must always maintain the work site in accordance with the requirements of these work permissions.

#### 2.1.2 STATEMENTS

Submit proposed transport, placement and connection procedures to the Supervisor for approval before work is started. Procedures shall provide for adjusted placement and coordination with other works in progress, a connection schedule of utility services, all necessary permits from utility supply companies, a detailed description of methods and equipment to be used for each operation and sequence of operations.

#### 2.1.3 CONDITION SURVEYS

In cases where neighbouring property could be touched or damaged by the container placement or the storage placement or the site board, then the Contractor shall carry out at his expense a detailed condition survey of the neighbouring property including photographic documentation a copy of which shall be presented to and approved by the Supervisor prior to commencement of the works.





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## 2.2 REQUIREMENTS AND PRODUCTS

All products and items as described in the following have to be included within the scope of work by the contractor.

### 2.2.1 SITE CONSTRUCTION FENCE

For purposes of safeguarding and protection, if needed, the contractor has to erect a fence surrounding the construction site, to prevent unauthorized access.

The Contractor shall install a fence surrounding the construction that is made from steel or solid wooden panels or similar material. The height of the fence shall be not less than 2.80 m. The support of the fence shall be stable and solid as to the direction of the Supervisor.

### 2.2.2 SITE INFORMATION BOARD

The contractor shall construct one board, carrying information supplied by and erected in the location specified by the Contracting Authority. The wording shall be presented in such a way as to be legible from a distance.

### 2.2.3 SITE OFFICE FOR SUPERVISOR

Where itemised in the Bill of Quantities the Contractor shall provide appropriate office facilities for the exclusive use of the Supervisor and his staff for the duration of the Contract. Such offices shall have an area of min 25 sq.m. and shall be configured to provide, as a minimum, two offices, toilet facilities and a store room.

The office container shall be ready-made from steel panels. Container should have windows on 2 sides. The container shall be burglar proof. The door of the container shall be lockable. All office containers should be equipped with the required furniture, computers and ancillaries, internet connection and heating.

The contractor has to cover the running and maintenance costs for the complete contract time.

### 2.2.4 ATTENDANCE UPON THE SUPERVISOR'S REQUEST

The Contractor shall provide to Supervisor all required attendance and , all equipment, tools and protective clothing, plastic bags for sampling, and survey assistants, chainmen and labourers, delivery personnel and transport, wooden pegs, iron pins and pickets, water, cement and aggregate for concreting, transport for labourers and materials, as may be required by the Supervisor and his staff for carrying out the sampling and laboratory testing activities and for checking, setting out, surveying, measuring or testing the work The Contractor shall provide all cleaners, labour, equipment, consumables and material which may be necessary for keeping all the buildings in a



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neat and clean condition, and any repairs shall be made immediately at the request of the Supervisor. The Contractor shall include in his rates in the Bill of Quantities, the cost of all attendance upon the Supervisor and his staff. No other payment shall be made in respect of attendance, except where a specific item is provided for in the Bill of Quantities.

## 2.2.5 PROTECTIVE EQUIPMENT

The contractor shall at commencement of the Works 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, ear plugs, goggles, torches etc.), the Contractor shall make these available to the Supervisors and when the need arises.

## 2.2.6 FIRST AID PACKS

The Contractor shall provide, to the Supervisor's satisfaction and compatible with current legislation, and maintain, two first aid packs. Each vehicle working within the site borders shall be provided with a first aid pack in accordance with the regulations in force and will be replenished, as necessary, together with the office supplies.

## 2.2.7 GARBAGE PLACE FOR DISPOSAL

The work includes the preparation of a garbage place for construction waste and debris.

The storage place for disposals and garbage shall be located close to the work site in order to allow easy access and transport from the work site; the garbage place shall be emptied each evening at closure of the construction site. The garbage storage shall include the provision of 4 movable garbage bins on rolls with lockable covers.

## 2.2.8 SANITARY FACILITIES

The Contractor shall avail sanitary facilities in relation to the number of workers and staff on site, but at minimum 2 separate toilet cabins shall be provided.

All sanitary facilities shall be provided, installed, operated and maintenance by the contractor. The number of toilets has to be approved by the Supervisor.

## 2.2.9 INDIVIDUAL POWER GENERATOR

For the use of the Supervisor, the Contractor shall provide, install, operate and maintain a diesel power generator.



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The power generator shall be equipped with a diesel engine and be of at least 4 kVA capacity.

## 2.2.10 SAFEGUARDING

The Contractor has to provide services for safeguarding the object over 24 hours a day and 7 days per week.

A service for safeguarding the construction site shall be provided. The service providers shall be properly equipped with uniforms and mobile phones to connect to the next police station. A cabin with windows for surround view at the entrance of the construction site shall be provided, equipped with heating device and spotlight.

The construction site is an archaeological site therefore due care must be taken to work on this site. For this reason, the site should be inspected and if any elements are found, they should be placed in the attention of the conservation architect. They should not be moved without permission.

If archaeological elements are found during the works above or below the surface, the works in the vicinity should be stopped immediately and the restoration architect should be notified together with the Ministry of Culture. Work can only continue after approval under the supervision of an archaeologist.

In cases where there is planned work under the surface for drainage system, for the removal of vegetation, it is not expected to have chances for finding archaeological elements, however great care should be taken with any surface or sub-surface work.

## 2.3 SITE PREPARATION

### 2.3.1 EARTH WORKS

These works consist of excavation, transportation, disposal, placement and impact of all materials encountered within the boundaries of the work, including construction of drainage, support, as well as excavation of ditches and canals necessary for the construction of the workplace in accordance with the purpose of the work. All excavations will be defined as, unclassified excavations, extraction, removal of unsuitable materials, rock excavations, borrowings or landfills.

Removal of Unsuitable Material should consist of removing soil and / or mixing soil with organic materials identified in the planned Contract or as directed by the Engineer, which would be detrimental to the road or embankment if left in place in the condition its existing. Rock excavations. Rock excavations consist of igneous, metamorphic and sedimentary rock which cannot be excavated without exploding or with the use of an excavator, including all rocks or other detached rocks.

Provide satisfactory soil materials for filling and refilling, free of mud, rock or stones larger than 100 mm in any dimension, litter, debris, vegetation and other harmful substances and use excavated or



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borrowed material sampled, tested and approved as accepted soil material. The material excavated in the borrowing pits has been selected and approved by the Engineers.

### 2.3.1.1 EXECUTION

Inspect the areas before excavation with the conservation architect or engineer outline the extent of excavation, limits, probable depth, and access.

EXCAVATION - consists of the removal of all materials encountered above the required grade elevations, setting aside satisfactory soil materials for reuse in backfilling (in trenches, around structures) and filling (for general grading and other purposes) and disposal of unsatisfactory and excess material. Unauthorized excavation consists of removal of materials beyond indicated elevations or lateral limits without the specific direction of the Engineer. Unauthorized excavation shall be replaced by backfilling and compacting as specified for authorized excavations unless otherwise directed by the Engineer.

When excavation has reached the required trench bottom or grade elevations, notify the Engineer for the inspection of conditions. If unsuitable bearing materials are encountered at these elevations, carry excavations deeper and replace the excavated material, as directed by the Engineer.

Slope the sides of excavation to the angle of repose of the in -situ material excavated, or provide shores, timbering, struts and sheeting, as required, and brace where sloping is not possible either because of space restrictions or is to be avoided because of the trenching requirements described later. Maintain sides slopes of excavations in a safe condition until completion of backfilling. Take prior precautions to prevent slides or cave-ins in excavation.

Prevent surface water and subsurface or ground water from flowing into excavations and flooding the work site and surrounding area. If water is encountered in excavation, it shall be removed without allowing it to accumulate, in order to prevent soil changes detrimental to the stability of subgrades. Provide and maintain pumps, well points, sumps, suction and discharge lines and other dewatering system components necessary to convey the water away from the site. Drain the water from excavations and rainwater to collecting or run-off areas. Trench excavations for utilities shall not be used as temporary drainage ditches.

COMPACTION - Control soil compaction during construction, as to provide at least the minimum percentage of density or the minimum relative density, if applicable, specified for each area.

Soil compaction for backfill in trenches around associated structures, for subgrade below equipment bases and for fill elsewhere shall not be less than the percentages of maximum dry density given below in sub-para (a) and (b) for soils which exhibit a well defined density, and not less than the relative densities in percent values given in the same sub-para determined, for soils which do not exhibit a well-defined moisture- density relationship.

Where the moisture content of a layer of the subgrade or other soil must be increased before compaction, water shall be applied uniformly to its surface and in such a manner that free water is



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prevented from appearing on the surface during the compaction operation. Soil which is too wet to permit compaction to specified density shall either be removed and replaced, or scarified and dried. Soil material, which has been removed because it is too wet to permit compaction may be stockpiled or spread in approved locations and permitted to dry. Drying shall be assisted by harrowing or pulverizing, until the moisture content is reduced to a satisfactory value.

**BACKFILLING** - Provide satisfactory soil materials for backfill and fill, free of clay, rock or boulders larger than 50 mm in any direction, debris, garbage, vegetable matter, and other deleterious matter. Only such excavated or borrow material shall be used in fills and backfills, as have been sampled, tested and approved by the Engineer.

### 2.3.1.2 DRAINAGE SYSTEM

It is necessary to remove water from the surrounding structure, as excess moisture often leads to serious deterioration of the stone and plaster. This section involves installing a drainage system to remove water from the site. The drawings contain the location of canals, catchment ponds, outlets and dimensions. Collection ponds should be installed at each turn in the direction of the drainage pipes. Inlet and outlet pipes should be 10 cm minimum, but should contain enough space to work in case cleaning is required. Put leaf guards on all entrances to prevent debris from entering the system.

Gravel should be 1cm - 3 cm evenly washed and clean and free of salt and dirt. Geotextile to be a non-woven synthetic polymer with various small holes with a minimum size of .211 mm # 70 with an open surface of 4% and a tensile strength of 100 kg. Be from an ISO 9001: 2008 certified manufacturer and be resistant to ultraviolet degradation and biological, chemical and salt environments.

The installation of the drainage pipe will start from a collection pond at the top of the collection system in the direction of the slope. The tubes will come out in the collection boxes according to the drawing details. The pipes will be placed on a slope of 1.5% - 2%. The catchment basins will be positioned at all direction changes in the drainage system. The locations of these collection ponds are shown in the drawings.

### 2.3.2 SITE CLEARING, HERBAL REMOVAL, WASTE DISPOSAL

This process includes the protection of all existing trees and terrestrial vegetation, or other necessary protective species to prevent damage to existing elements that will not be removed, and all elements on neighboring properties or adjacent to the project site. This includes the aqueduct, the surrounding wall, the spring and especially the historic olive groves or any other element that is not included within the project scope. Protect existing trees and other vegetation that will remain as it is, from cutting, breaking or rooting, bark decay, smoking of trees from accumulation of building materials or excavations within marked lines, from excessive pedestrian traffic or vehicles, or parking



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vehicles within the marked line. Provide temporary fences, barricades or surroundings as required, to protect trees and vegetation, to be left as is.

Removal and disposal of shrubs, their roots, grass, wild plants, surface debris, fallen organic material and rotten trees, clearing the site and preparing for further activities. This includes cleaning and removing debris and disposing of off-site or storage as directed. The work should be limited to the area shown in the drawings. All cleaning should be done with hand tools or small mechanical gasoline cutters and chainsaws.

Note: only small hand tools for mechanical cleaning are allowed. Large machines towed by tractors are not allowed. Large tree trunks should not be removed. Mechanical cutters are not allowed to be used within 2 meters of any stone wall or object.

Large shrubs should be removed from this area carefully given the archaeological nature of the site. Work to remove shrub roots can not progress beyond 0.5 m (1 / 2M) below the surface. Trees will NOT be removed and must be protected at all times. All communal installations must be protected and not damaged.

Remove all debris material from the site including all barbed wire free from old fences. Remove debris from the facility in such a way as to prevent field losses. Keep at all times the whole building and the area near the building, clean and free from mud, dirt, debris. Clean the waste generated by cleaning the facility continuously according to the progress of the works.

Caution: Waste incineration is not allowed and all material should be removed according to the orientation of the restoration architect. Avoid the accumulation of cut material near any building to eliminate the risk of fire.

## 2.4 SCAFFOLDING

All scaffolding shall be designed and erected in accordance with the relevant standards. Only experienced and competent scaffolding erectors shall carry out erection. The Contractor shall ensure that any necessary modifications to the scaffolding during the course of the works shall be accepted by the scaffolding erector so that scaffolds shall remain suitable for the purpose for which they are intended throughout the works. The signed approval of the scaffolding shall be made visible at each ground level access point to the scaffolding. Working on unapproved scaffolding is strictly forbidden.

Care shall be taken that the load of any debris collecting on a scaffold does not exceed the loading for the design. The maximum permissible loading of the scaffolding shall be clearly visible at all ground level access points. All measures necessary shall be taken to prevent debris from being accidentally dislodged from the platform.

Steel scaffolding of trestle type, in accordance with local standards and regulations, including the supply of supports, maintenance, assembly, anchorage, dismantling etc. 15 cm toe boards shall be



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provided on all levels. Weatherproof sheeting or at least protective netting shall be provided on the outside of the scaffolding.

### 3. PRELIMINARY WORKS

Before starting the executions, the permission and the observation of the observation of the architect or the engineer is required and an inspection must be carried out. The demolition works will begin only after the electricity and other networks of the existing facility installations are totally disconnected. Partial demolition methods must be such in order to the remaining part of the structure ensure the stability of the building and the other parts. Steel elements and reinforced concrete structure will be cut lengthwise according to the width and other dimensions in order to not fall. When demolishing the elements measures must be taken in order not to endanger the other structural supporting or other elements. Generally, the demolition works should start removing the unnecessary load as much as possible, without interfering the basic structural elements. Careful work will be carried out in order to remove the main loads under the most difficult conditions.

Demolition works in Restoration are a very important process. In such works, the participation of specialized workers are very much appreciated and needed. They must be always supervised by the technical manager of the works. If during the demolitions, are shown footprints that brings new evidences according to the monument, they must be documented and the Engineer or Restoration Architect should be informed.

In order to achieve the consolidation and the revitalization of the museum the following interventions are needed:

#### 3.1 REMOVAL OF FURNITURE AND VARIOUS EQUIPMENT

These works are part of the preparatory work before the construction works start in the object.

#### 3.2 DISMANTLE OF DOORS, WINDOWS

##### 3.2.1 DISMANTLE OF WINDOW FRAMES

Existing windows and window frames will be dismantled as they are assessed as damaged and do not present the necessary conditions in terms of safety or even thermal and acoustic conditions.





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### 3.2.2 DISMANTLE OF DOORS

- *of one fold*

- *of two folds*

Damaged interior doors will also be dismantled. Removal of doors and windows will be done before the demolition of the wall, including the case, frames, etc. First the door is removed from the hinge and separated from the case and then the bandages are removed outside and inside the door. Then, with a wood saw, cut the polyurethane foam that connects the case to the walls and the door arch. After that, the wooden wedges are removed and the case is taken out of the place, and then they are collected in a special place on the construction site.

### 3.2.3 DISMANTLE OF THE WINDOW SILL

Once the windows have been dismantled, the window sills will be removed. They can be removed with a hammer and chisel or with jackhammer smaller than 15 cm. Care must be taken that the workshop is on the pier outside so that the pieces preferably fall inside the building and not outside. So its breaking and separation from the object to be controlled.

## 3.3 BRICK WALL DEMOLITION

When modifying or demolishing masonry with either solid or perforated bricks of any type and dimension care must be taken to ensure a clean finish in the amount of sections where demolition is needed. Care must be taken so that the floors do not carry the added shock that comes as a result of debris falling on them. dimension care must be taken to ensure a clean finish in the amount of sections where the need for demolition arises. Care must be taken so that the floors do not carry the added shock that comes as a result of debris falling on them. Demolition of the wall starts from the part where the wall touches the floor, so that the wall does not collapse all over. It breaks diagonally from top to bottom. The bricks are crushed as they will not be reused. After the whole wall is broken, the pieces of brick and mortar are taken by cart and taken to the landfill, from where they will be removed by vehicle.

## 3.4 REMOVAL OF THE PLASTERBOARD

Demolition of plasterboard coatings will be done before demolition work on the floor begins. At first the plaster is removed and divided into small pieces. The gypsum structure is then removed by removing the gypsum screws that hold the UD to the CD.

## 3.5 LAYER DEMOLITION WORKS

Layer demolition of any type up to base layers according to technical drawings and moving materials to the landfill where they will be removed by vehicle.



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- 3.5.1 DEMOLITION OF WALL LAYERS IN TOILETS as defined in the technical drawings;
- 3.5.2 DEMOLITION OF TOILET FLOOR LAYERS as defined in the technical drawings;
- 3.5.3 DEMOLITION OF TILED FLOOR LAYERS as defined in the technical drawings;
- 3.5.4 DEMOLITION OF WOOD FLOORING LAYERS according to the definition in the technical drawings;
- 3.5.5 DEMOLITION OF STAIR MARBLE CLADDING as defined in the technical drawings;
- 3.5.6 DEMOLITION OF VERANDA LAYERS as defined in the technical drawings;
- 3.6 DEMOLITION OF THE FINISHES AND CLEANING

#### 3.6.1 PARTIAL DEMOLITION OF PLASTERS and cleaning

Detailed assessment of the condition of the plaster in the interior walls by the restoration specialist, identification of the border between the areas where the original plaster will be preserved and the areas where it will be broken to be reapplied. This determination is done mechanically by making light strokes with the spatula on the plaster surface (in areas where the plaster has formed pockets and is detached from the wall surface, the shocks have a different sound from those in areas with plaster under unaffected condition).

Once the areas where the plaster will be demolished are determined, will continue by removing the damaged plaster manually until the masonry comes out, washing the surfaces with water under pressure and further cleaning with a wire brush the bare masonry surface from plaster. The plaster is cut cleanly within the boundaries of the sections where the problem occurs.

- *Interior walls*

- *Facade*

- Cleaning of the facade from dust and surface deposits with water through a pressure pump

- Cleaning of the biological patina from the surfaces using herbicide substances

#### 3.6.2 PARTIAL DISMANTLE OF TILES ON EXTERNAL WALLS

After a detailed assessment of the existing condition of the tiles on the exterior facade of the building, they will be dismantled where problems arise. Dismantle will be done with care so as not to damage other tiles which will be the main focus of the works. Tiles should be stored in a special place not excluding the possibility of their possible reuse.



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### 3.7 DISMANTLE OF INSTALLATIONS

3.7.1 DISMANTE OF VARIOUS MECHANICAL INSTALLATIONS such as ventilation equipment, discharge and water supply columns, horizontal and vertical gutters.

#### 3.7.2 DISMANTLE OF HEATING AND FURNACE INSTALLATIONS

Dismantling of radiators, radiator supply lines, of water delivery columns in the radiator, disassembly and adjustment of boilers, dismantling and collection of boilers, fuel, boiler chimney detonation.

#### 3.7.3 DISMANTLE OF EXISTING EQUIPMENT, ELECTRICAL INSTALLATIONS AND LIGHTING

Removal of all electrical cables up to the public power supply point. All lighting cables, plugs, electrical frames, and other removed equipment must be transported to a public location. Reuse is not allowed in any case.

#### 3.7.4 REMOVAL OF THE AIR CONDITIONER UNITS, MECHANICAL SYSTEMS AND HEATING SYSTEM

#### 3.7.5 COPPER PIPES REMOVAL

#### 3.7.6 REMOVAL OF THE CURTAIN ON THE CORRIDOR

### 3.8 DISMANTLE OF THE EXHIBITION CASES

The exhibitors will be dismantled before the demolition of floors and electrical installations begins to be collected in a special place inside the construction site.

### 3.9 FULL DISMANTLE OF THE SANITARY EQUIPMENTS

### 3.10 FULL DISMANTLE OF THE DETERIORATING SKYLIGHTS, INSTALLATION OF THE VENTILATION MECHANISM AND REMOUNTING

### 3.11 DISMANTLE OF THE VERANDAS' TILES, CLEANING AND REMOUNTING

The veranda tiles will be removed in such a way that new layers will be placed, cleaned and restored.

### 3.12 REMOVAL OF THE CURRENT CRACKED PLASTER FROM THE EXTERNAL COLUMNS

The current acrylic plaster will be removed from the outer columns so that the surface of the columns is leveled where necessary and then a new layer of acrylic plaster will be reapplied.



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### 3.13 GRASS SCARIFICATION THROUGH SHOVEL

### 3.14 MATERIAL TRANSPORTATION IN AUTHORIZED PUBLIC AREAS IN A DISTANCE OF 45 KM.

### 3.15 GARBAGE TRANSPORTATION BY CAR OF 6KM LOADED BY ARM

The Contractor shall not use bags or bins to remove the construction waste or the dismantled materials during works. For this reason, they shall use appropriate materials for the disposal of disposable materials or waste and shall transport such materials off site as often as possible. required. Disposal and transportation of waste and garbage in a way that will prevent their dumping on the road or in the surrounding areas.

## 4. MASONRY WORKS

This chapter refers to the works of cleaning up, preparing data, and applying new materials to a current structure. These works must be carried out after having installed and completed all other work, including the water control elements.

A sample of the geotextile they make use of, the sample of the aggregate base and the final material.

### 4.1 GYPSUM WALL

#### Type W111, CW00, Aquapanel indoor +1x12.5 stone wool on each side 1x40kg/m3 40mm

Supply and installation of gypsum partitions with four sheets (two on the side), against moisture with a total thickness of 12.5 mm (based on sketches) consisting of a metal structure in galvanized steel profiles (6/10 in thickness perimeter "U" with the main guide with a thickness of 50/75/100 mm and vertically "C" with divisions at equal distances of 60cm), on which the gypsum layers are screwed; with CaSO<sub>4</sub>·2H<sub>2</sub>O composition with specific moisture absorption and parameters as follows:

- Fire reaction, class EN 13501-1: A2-s1, d0,
- Resistance to water vapor factors  $\mu$ : 10 (dry), 4 (wet),
- Thermal conductivity  $\lambda$ : 0.20 W / mK,
- Density:  $\geq 760$  kg / m
- Plate weight  $\geq 9.5$  kg / m<sup>2</sup>,
- Flexion weight  $\geq 550$  N longitudinal and  $\geq 210$  N transverse
- Water absorption after two hours of total immersion should be no more than <10% of the weight of the plate.
- Acoustic insulation



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The performance of acoustic pollution prevention materials must be guaranteed for any type of separation in accordance with executive indicators.

The values determined by the experiments should be higher than those described with the following tolerances: the sum of the level of variation between the required and measured values should not exceed 12dB and also the maximum deviation for each frequency should not be higher than 5dB.

#### - Waterproofing performance

For wet spaces the inner insulation layer must be applied, certified according to certain conditions. Humidity variations within spaces where insulation layers are not installed should not create dimensional changes or degradation of the material to those layers.

#### - Resistance to shocks

The walls must be able to withstand 3 gentle body shocks with an energetic impact of 250J (around 25kgm) and strong bodysuits with an energetic impact of 10J, thereby maintaining structural integrity, preventing the body from passing beyond the layer, not to pass through the skeleton, not allowing fragments which detach and may cause accidental injury or damage to humans. Testing procedures must comply with ICITE-UEATC standards.

#### - Resistance to hanging or fixed devices

The wall itself and the connecting devices must be able to resist, without deformations permanent changes and without visible damage, a load of 100kg applied parallel to the wall surface, at a distance of 30cm from it and distributed in a length of 50cm in the direction of length. Testing and adhesive equipment must be supplied by the manufacturer.

#### - Resistance to radiant heat

The gypsum wall must withstand without noticeable changes and permanent deformations, detachments, changes in shape and appearance, or heat breakage caused by the radiation of a 250 l lamp.

### 4.1.1 EXECUTION

- Place the partitions and mark the floor and ceiling with a chalk line and magnetic leveler. Apply non-elastic insulating material and closures on the metal profile (both in the shape of "U" and "C") by fixing them with screws, clamps and nails.
- Check the position and direction; if the floor guide application is in the kitchen / bathroom, place a layer of bitumen or polyethylene sheet under the metal profile, with vertical brackets up to 2cm for total protection of profiles and layers and water penetration.
- Place the profiles "C" (with a length of about 1cm less than the distance between the base and the guide "U"), all oriented in one direction, initially placing those which are attached



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to the doors or placed at interlocking other walls, connecting them to the rails using screws at set distances.

- Place the layers (with the same height as the room in which they are minus 1cm from the ground) in order to find the connection with the adjacent layers along the metal columns; joints along one side of the partition wall must be scaled in respect of the other side, in terms of two-layer partitions in the first layer must be interlocked opposite the first; horizontal joints should be scaled on both sides.
- Gypsum layers should be placed with screws at a distance of not less than 1cm from the corners of the length and 1, cm from the corners / transverse sides / opposite. The distance between the screws should be about 30cm with a layer on each side of the frame; for two-layer partitions, the first inner layer will be screwed in to around 80 cm equidistant distance, while the second outer layer will be screwed in to approximately 25cm equidistant distance.
- Place insulating material between the panels (mineral cotton).
- Joining the grout and mortar along the ends of the layers and joints; a reinforcing tape should be applied along the entire length of the joint to the still fresh grout, and another layer of grout should be placed to cover the strip and all nails or screw heads.
- After total drying the joint should be covered with the final layer, with at least 5cm excess on either side; then a second layer should be placed to cover the first layer with a greater width of around 30cm.
- After drying the last layer, the surface should be treated more abrasive.
- All corners and inner sides shall be reinforced and secured with reinforcing tape or metal angles along their entire length.
- Where gypsum wall partitions are joined with walls built of brick or other elements, or for large dimensions partition / partition with non-continuous gypsum walls (> 15m<sup>2</sup>, presence of door and window openings) joints of partitions should be realized, 1 / 1.5 cm wide, along the entire length and thickness of the partition. The end of the joint should be tightly closed in depth (invisible) with a suitable elastic material. Proper anchoring systems should be included to hold the bathroom furniture.

## 4.2 WALLS WITH STRUCTURAL BRICKS

Masonry with structural bricks of 20cm and 25cm and traditional "bastard" type mortar m-25, with dosage per m<sup>3</sup> cement (m-400) 14 kg and water, for any thickness including any workmanship and material for connecting teeth, corners, window sills, service scaffolding and everything other necessary for finishing the masonry and its realization in a perfect way.



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## 4.3 CEMENT MORTAR PLASTERING

Plastering with cement mortar will be done wherever there is plaster damage inside and outside the Museum. Once the problem is identified and its demolition and cleaning is done, then this type of plastering is applied as follows.

### 4.3.1 EXECUTION

Base layers are of two types before we apply the final layer. These two types consist of the hard layer and the brown one. Mix the coarse layer with the mass of a volume quantity of Portland cement, 0 to  $\frac{3}{4}$  of the total volume quantity, to be hydrated lime powder and 2 and  $\frac{1}{2}$  of the four parts to be sand. Mix the brown layer with the mass of a volume of Portland cement, 0 to  $\frac{3}{4}$  of the total volume to be liquid lime powder and 3 of 5 parts sand (volume of sand in relation to cement and mortar thickness). Mix the final layer with the masses of one part by volume of Portland cement with not more than one part liquid liquid and not more than four parts by volume wet sand

Use during work will determine the amount of lime and sand used in the final layer, within the limits described below. The color of the grout must be approved by the paint manufacturers upon request for the required color.

Mixing of materials is usually done with mechanical equipment while in the case of the final layer it can be done by hand. Mechanical mixers must be approved in such a way as to uniformly mix well the mass inside them with the amount of water. When mixing by hand, it should be uniform in color in the preparation bucket, add water and mix evenly and continuously.

## 4.4 ACRYLIC MORTAR PLASTERING

Primary treatment in the area of intervention for unification, repainting with paint and chemistry with special concrete with synthetic mortar brand C25 / 30 will be done wherever there is damage to the plastic plaster of the columns. Acrylic mortar with marble grains, which is made for long-term protection of exterior and interior surfaces. Has exceptional resistance to water and changing atmospheric conditions.

### 4.4.1 EXECUTION

Before applying the acrylic plaster of the facade, the surface should be prepared: remove the old coating or paint, dirt and greasy stains (lubricating agents) and paint it with a substance suitable for acrylic. To work with this material, you only need a container for it and a spatula. If the mixture is dry, it should be diluted, but only in the amount needed for a small work area. This is due to the property of acrylic plaster to dry quickly. Therefore, it is necessary to divide the entire perimeter of the work into several sections. It is not recommended to work on a rainy day, and moisture should





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not enter the plastered surface until it is completely dry. Plaster can be applied using a plastering machine when there are large surfaces.

## 4.5 GYPSUM CIELING WITH METALLIC CONSTRUCTION

Standard gypsum tile

Gypsum tiles for the ceiling will be composed of prefabricated flat tiles, filled with stabilized mixed gypsum compound, coated on both sides with special sheets of cardboard. It must have the characteristics that must meet the requirements. These types of false ceilings must be fixed mounted by means of self-drilling screws in a structure consisting of metal profiles double frames, suspended on the ceiling beams, according to design specifications, or via hanging brackets. Particular attention should be paid to the end of the joints between the panels and between the panels, as well as the walls of the room. After installation, the surface should be completely flat.

For external applications special waterproof boards / tiles will be used, with a water-resistant core and waterproof coating, resistant to atmospheric conditions and have a water absorption of not less (<3%) for construction of walls, ceilings and partition walls high materiality, outside the house or environments where humidity is high (swimming pools, SPA ...), resistant to mold, resistant to decay. Other features will be:

Resistance (EN15283-1): longitudinal break load > 500N, transverse load break > 250 N

- Compression resistance  $\geq 10$  MPa,
- Acoustic system in accordance with the geometry of the system,
- Fire resistance (EN13501-1): Euroclass A2-s1, d0,
- Weight: 10.8 kg / m<sup>2</sup>,
- Thermal conductivity (EN125224):  $\lambda 0,25$  W / mK,
- Thermal resistance: R 0.05 m<sup>2</sup>K / Ę,
- Maximum water resistance after 2 total dives: <3% of the slab weight,
- Water vapor permeability: 220 g / m<sup>2</sup> / day,
- Vapor Resistance Factor (EN12572):  $\mu = 11$

Dimensional variations up to 20 ° C from 65% to 90% RH (EN318): longitudinal 0.15 mm / m, transverse 0.11 mm / m



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Resistance to low temperatures: without cracking

Mold resistance: 10/10 (maximum resistance according to ASTM D3273).

Mineral Fiber

Suspended ceiling is positioned at a height of up to 3 m, achieved through the supply and installation of mineral fiber tiles 60x60 or 30x120 cm, thickness 15 mm, class 1, decorated with visible appearance, finished in the factory with one layer and painted with two white acrylic paint hands, does not contain asbestos is baked in the oven at high temperature along with the hidden support structure, including the structure support, clamps for hanging on the ceiling and any other necessary equipment.

Different types of modular elements must be used according to different conditions of use:

for connecting areas - A2-s1, d0 class fire resistance (EN13501-1), Rei 120, acoustic absorption  $\alpha \geq 0,95$  (EN ISO 11654), thermal conductivity  $\lambda 0040 \text{ } \ddot{\text{E}} / \text{mK}$  (EN 12667), moisture resistance up to 95% RH, sterile room class 4 (ISO 14644-1);

for technical rooms - A2-S1, d0 fire resistance class (EN13501-1), acoustic absorption  $\alpha \geq 0,65$  (EN ISO 11654), thermal conductivity  $\lambda 0,052-0,057 \text{ } \ddot{\text{E}} / \text{mK}$  (EN 12667), moisture resistance up to 95 % RH; for corridors and reception areas - A2-s1, d0 or C-s1, d0 class fire resistance (EN13501-1), acoustic absorption  $\alpha \geq 0,65$  (EN ISO 11654), thermal conductivity  $\lambda 0,052-0,057 \text{ } \ddot{\text{E}} / \text{mK}$  (EN 12667) humidity up to 95% RH;

for bathrooms, and humid environments - A2-s1, d0 fire resistance class (EN13501-1), REI 120, acoustic absorption  $\alpha \geq 0,90$  (EN ISO 11654), thermal conductivity  $\lambda 0040 \text{ } \ddot{\text{E}} / \text{mK}$  (EN 12667), humidity up to 100% RH, sterile room class 3 (ISO 14644-1).

Suspended capture units

Placement of panels by configuration (only for dry environments)

To enable gypsum panels made of asbestos material 600 mm wide, 15 cm thick, by means of smoothing

The following requirements:

Type: standard with asbestos-free gypsum. Te lyera. White color

Shape: square

Class: 1, non-combustible.



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Noise reduction and their coefficient: Minimum 0.60.

Normal size: 600 by 600 mm.

Placement of panels according to the configuration (only for humid environments)

To enable gypsum panels produced from asbestos materials 600 mm wide, 15cm thick with rounded sides.

The following requirements:

Type: standard with asbestos-free gypsum. Te lyera. White color

Shape: square

Class: 1, non-combustible.

Noise reduction and their coefficient: Minimum 0.60.

Normal size: 600 by 600 mm.

Suspended Systems

The following requirements: Type: exposed mesh with galvanized aluminum in steel.

Structural classification: Easy task

Conclusion: Exposed surfaces to be viewed should be of a uniform width and white in color

Accessories: to enable the manufacturer's standard components for final catches.

Enabling: Panels not less than 600 by 600 mm in size within a 24 by 32 mm grid which should enable access to the space above the ceiling. All panels within the network must be removable through the panels and access to them.

Pendants and hanging parts

Woven steel, zinc or cadmium or cadmium coating

Wires

2.7 mm in diameter galvanized steel with a thin layer of zinc.



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#### 4.5.1 EXECUTION

The installation implies the use of a metal structure consisting of a lightweight metal profile ( $\geq 0.6$  mm) with a cold profile and protected from oxidation by hot-dip galvanizing with zinc. Metal profiles are of two types: - guides "U" 30/15, 30/27, 25/25 which must be placed on the wall. - "C" columns 50/15, 50/27, 60/25 should be included in the bridges and connected to the upper plates with hanging clamps, with an equal distance depending on the calculated load class.

Column "C" should be cut to a length equal to the distance between the rods added by 15 mm to allow placement on the suspension. When the profile length dimension does not allow covering the entire distance between the opposite walls, it is necessary to continue with a connecting joint. It must then be performed using linear joints and respecting the following rules: the joint must be interlocking and must enable at least one mechanical force equal to that profile. Place the clamps inside the guides and then secure them to the selected suspension system. The tilt should be performed without inserting them from above from the local center. Check the flatness (irregularities should be less than 5 mm) and the horizontality of the net (the level of change in respect of the net square should be less than 3 mm / m).

##### Suspensor

Place 1200 mm hangers in the center of each direction. Place the hangers outside for each room or space. Place entire hangers where required to support the net around columns, grilles and other ceiling exits. Cut wires can be used if the wire placed at the same angle as the first wire is installed and joined to the same hanger. No other pendants or other loads may hang from below the net. Where lights are held from the suspended ceiling, the hangers should be of a minimum of 4 light hangers and placed no more than 150 mm for each corner of the light. Wooden brackets should not be dipped into wooden clips because nailing to the base is strictly prohibited. Pendants should not be placed on building services such as cable ducts, pipes, wells, etc. Generally the ceiling should be installed as the expansion of the frame allows.

##### Ceilings under concrete slabs

The seat hangers under the reinforced soles should be installed so as not to damage to secure. For the plan must be decided before installation. Pendants should not be placed under the beam but next to them.

##### Hanging parts

Keep main canals and rails clean of wall and partition restrictions. The same are the two main rails for the environment.

##### Ramp



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The maximum permissible deviations of  $l / 500$  should not be exceeded, where  $l$  is different space.

The Units

The corners of the ceiling tiles should be in close contact with the full metal right. Feel so that those which are less than  $1/2$  in width are felt. The panels must be installed in order to be removed with the equipment.

Temporary clamps

When installing the lateral movement of the frames should be used for proper fasteners.

Wall modules or sidewalls

To be installed as murals in suspended ceiling openings and vertical attacks. The sides where the walls intersect or intersect, be installed angularly. Install secure reinforcements within 75 mm from the ends of any length and not more than 400 mm in the center of the end connections.

Regular coloring

The ceilings should have regular tonal surfaces.

Maintenance materials (spare materials)

Provide one more module for each of the 50 installed capabilities.

## 5. TERRACE AND VERANDA WORKS

### 5.1 DELIVERY, CONSERVATION AND TREATMENT

#### 5.1.1 DELIVERY

Deliver on-site materials in manufacturer's standard containers that are undamaged and unopened and that contain the following readable information:

Manufacturer name;

Brand name;

Specification number, type, and class, as applicable, when materials are covered by a specified specification; Send materials in sufficient quantities to allow continuity of work.



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## 5.1.2 STORAGE AND TREATMENT

Storage and handling of materials in a manner to protect it from damage, exposure to open flames or other flammable sources and from moisture, condensation or moisture absorption. Store in an enclosed building or container which enables a dry and suitable ventilated environment. Replace damaged materials with new ones. Rolls of material should be stored vertically.

## 5.2 ENVIRONMENTAL CONDITIONS

Do not install terrace insulation during inclement weather or when the air temperature is below 5 degrees Celsius or when there is visible frost, ice or moisture on the terrace or when there is a lot of wind.

## 5.3 PRODUCTS AND MATERIALS

### 5.3.1 LEVELING LAYER WITH CEMENT MORTAR

Portland self leveling cement is a type of pourable cement that is primarily used in the preparation of interior floors as an underlayment to support new floor covering installations. As the name implies, it "self-levels" because of its relatively thin consistence. This unique quality in a cement product enables it to be laid in a very thin layer - from 0.5 to 5 cm without losing any of its compressive strength or elasticity. This product requires very little curing time (between 12 and 18 hours) which means that the final flooring covering can usually be installed the very next day. It's easy to use, and an excellent way to fix cracked, uneven or out-of-level floors with minimal effort.

#### 5.3.1.1 EXECUTION

##### 5.3.2 Step 1

Prepare the substrate, which is the material upon which the Portland cement will be laid upon. Remove loose stones or rocks, and clean up as much dirt as possible with a shop vac. Exterior grade plywood and cement backer board substrates should be firmly attached to the existing floor using additional deck screws if necessary. The tiles should all be firmly attached prior to installing the Portland cement. Materials such as adhesive, glues and caulks and other flexible materials should be removed if possible, since they are not acceptable substrate materials.

##### 5.3.3 Step 2

Put on eye protection. Add approximately six quarts of cool clean water to a large cement mixing pan. Add one bag (50 pounds) of Portland self-leveling cement to the water slowly. Mix slowly by hand using a masons trowel until it becomes a pourable "syrup like" fluid. If large quantities are desired, use a slow speed bucket mixer, but do not use any high speed devices. .



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#### 5.3.4 Step 3

Ration the entire mixing process, so that you do not mix more self-leveler than you can use within ten minutes. Increase or decrease the quantities mixed as needed. Do not over mix, since the self-leveling compound will begin to set immediately after it contacts water.

#### 5.3.5 Step 4

Pour the Portland cement self- leveler mix onto the floor, applying more quantity of the mix to low areas and less to high areas. After the entire batch of mix has been applied, use a cement squeegee with the adjustable height pins set to your desired depth to spread the material. Remember you only have approximately 10 minutes after mixing to complete your application. Smooth the surface using the squeegee.

#### 5.3.6 Step 5

Allow the mix to cure for at least 5 hours before you walk on it. Allow 18 hours before applying any additional stress, such as nailing or sliding heavy objects across it.

#### 5.3.7 THERMAL INSULATION 2X5CM WITH POLYSTYRENE P = 15KH / M3

Terrace insulation will be made of high density polystyrene (XPS) panels.

The polystyrene panel will serve as a wrapping layer, lined for the utilization of gases in accordance with EU and national regulations (CO<sub>2</sub>), thermal conductivity  $\lambda$  0.033  $\dot{E}$  / mK, compressive strength  $\geq 3.7$  kg / cm<sup>2</sup>, diffusion resistance factor of water vapor  $\mu$  160  $\div$  224.

The panels will have profiles as overlapping lids on all 4 sides to eliminate thermal bridges, water absorption volume  $\leq 0.10\%$ , fire response class should be: Euroclass E technically suitable for insulation of light and terraces flats in accordance with DIN standards issued by the "Deutsches Institut fur Bautechnik".

##### 5.3.7.1 EXECUTION

The panels should be placed with matching alcoves.

The lateral filter layer should be superimposed 75 cm turning vertically, in order to protect the membrane from damage occurring below the insulation due to debris caused by water penetration; Install exhaust pipe holes and gravel grilles - to ensure the continuity of the insulation layer, insulation panels will also be placed along or above the drainage channels, and later covered with concrete slabs;

Use spaces / gravel layers under the end of the walkway for drainage or in the case of usable terraces, the appropriate layer of poor concrete or a layer of cement mortar in accordance with the calculated structural loads.





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Parapet insulation will be with mineral wool stone panels, with thermal conductivity  $\lambda 0.035 \text{ W / mK}$ , and resistance coefficient for vapor distribution  $\mu 1$ , delamination  $> 10 \text{ kPa}$ , 10% pressure during compression  $> 30 \text{ kPa}$ , reaction class Fireplaces: A1 - non-combustible material.

The panels should be placed with matching alcoves

Overlap the filter side layer 75 cm turning vertically, in order to protect the membrane from damage occurring below the insulation due to debris caused by water penetration;

Install exhaust pipe holes and gravel grilles - to ensure the continuity of the insulation layer, insulation panels will also be placed along or above the drainage channels, and later covered with concrete slabs;

Use spaces / gravel layers under the end of the walkway for drainage or in the case of usable terraces, the proper layer of poor concrete or a layer of cement mortar in accordance with the calculated structural loads.

Parapet insulation will be with mineral wool stone panels, with thermal conductivity  $\lambda 0.035 \text{ W / mK}$ , and resistance coefficient for vapor distribution  $\mu 1$ , delamination  $> 10 \text{ kPa}$ , 10% pressure during compression  $> 30 \text{ kPa}$ , reaction class Fireplaces: A1 - non-combustible material.

#### Installation

It is important that in case of fire, the panels, fixing details are designed within the norms in order to be stable. Therefore:

- All fasteners will be made of steel and not aluminum,
- Corners / channels should be made of steel with a minimum thickness of 1.6 mm.
- All fasteners must be made of stainless steel.

#### 5.3.8 LAYER OF FOAM CONCRETE FOR SLOPE, MIN 5-8 CM

Floor substrates should be supplied and installed in accordance with best practices and accompanied by relevant data certifying technical data and performance characteristic.

Laying of mortar will be carried out in two layers.

The first will be lightweight concrete type CT-C20-F4, depending on the thickness that will be placed between the floor, the final layer of mortar consisting of a two-component product that has cement binder and thinner.

Mixing must be done with the right machinery. Doses should be  $300 \text{ kg / m}^3$  cement binder and 2 l / m cough enabling a mortar with a compressive strength for 28 days  $1 \text{ N / mm}^2$ .



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#### 5.3.8.1 Execution

Before being covered with other layers a partial acceptance must be made by the Supervisor. The lightweight concrete layer is placed after thermal insulation.

#### 5.3.9 H / INSULATION WITH 2 LAYERS OF 4MM GUINEA WITH 100% ADHESIVE

Two waterproofing membranes against moisture prefabricated in elastic-plastic-mercury bitumen with a layer of fiberglass and or polyester layer, applied on the bituminous layer, on the sloping and horizontal surfaces, with an overlap of 10cm on top of each other. The material must be certified as compatible with the insulating material to prevent loss of plasticity.

Characteristics:

- Extension at the ends of unequipped components (NFT46002) 2000%,
- Longitudinal tensile strength 90 degrees transverse 80Kg / 5cm,
- Elongation at longitudinal ruptures 50% transverse 50%
- Fatigue resistance in active cracks at 0 ° C 10,000 cycles - at -10 ° C - 1,000 cycles,
- Flexibility to cold - 25 ° C.

#### 5.3.9.1 EXECUTION

Make sure that the necessary conditions exist before applying the membrane materials:

Drainages, slopes, ditches and supporting equipment are positioned. Surfaces are solid, dry, flat and free of cracks, crevices, and strong changes in height. The substrate is perforated as shown to enable effective drainage. On-site fabricated substrates are allowed to cure and surface dryness with the specified requirements to be met. The curing of the substrates must be in accordance with the membrane system. All corners will be rounded using insulating material or mortar to prevent folding of the material.

#### 5.3.10 CEMENT FINISH 1:2 t=20 mm

The second layer will be: leveling cement varnish, variable thickness.

#### 5.3.10.1 Execution

Mortar will be shredded during openings in walls or any type of platform, by inserting a partition tile into the mortar, during paving or after hardening / setting. After coagulation, the mortar should have a compressive and bending strength after 28 days of 20 and 45 N / mm<sup>2</sup>.



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### 5.3.11 PARAPET PLASTERING, MIXED MORTAR M25

The primary requirement of plaster work should be to ensure an absolutely waterproof closure, dense, smooth and strong and without any cracks inside and / or outside. The contractor must ensure that this objective is achieved. All plastering must be carried out in the right way, without any defects and form a tee fortée base for the latest materials such as paint, etc. Masonry and concrete surfaces that require the application of plaster must be cleaned of all impurities in a way that ensures proper connection between the materials.

All joints between concrete frames and masonry in filling, should be expressed with a cut in plaster. The groove mentioned must coincide with the joints below as instructed. Where no grooves are required, the joints between the concrete parts and the filling masonry shall be covered with plaster mesh made of galvanized steel strip 177.8 mm wide, approximately 0.35 mm thick and weighing approximately 0.095 kg.

### 5.3.12 GEOTEXTILE PROTECTING LAYER

Where specified in the technical drawings or under the direction of the Supervisor (facade walls, roof, etc.), the Contractor shall provide plastic filter cloth (Geotextile). Geotextile will be composed of polypropylene or polyester without the use of adhesives. It will be performed in accordance with one of the following:

- with continuous fibers,
- with interwoven fibers ("interlocking" with industrial knitting system),
- with suitable fibers interwoven with the length reached by the mechanical needles.

The Contractor shall provide the details, with a certificate stating the name of the manufacturer, the name of the product, the style number, the chemical composition of the filament or weave, and any relevant information, and examples of the material proposed to the Supervisor for review and approval.

Labeled geotextiles, transport and storage must be in accordance with ASTM D 4873. Product designations must clearly indicate the manufacturer or supplier name, style designation and roll number. Each transport document must include information which certifies that the material complies with the manufacturer's certificate.

### 5.3.12.1 EXECUTION

Each geotextile roll should be wrapped with a material which will protect the geotextile from possible damage during transport, water, sunlight and pollutants. The protective cover must be stored during the period of transport and storage. During storage, geotextile rolls should be lifted off the ground



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and properly covered to protect them from damage to the physical properties of the geotextile properties.

Measure the insulation to cover the surface of the soletees. Apply nee soletee adhesive and place the binders on the adhesive according to the manufacturer's recommendations. After treating the adhesive, install the insulation over the binder, twist until the steel clamps are flattened with the insulation, all sides of the insulation and close the strip.

Maintain insulation from damage to vertical surfaces during construction and filling using 5cm thick polystyrene. Do not allow unprotected vertical insulation at night. Install protectors during the entire period of exposure of insulating panels.

## 6. FINISHES

### 6.1.1 ENVIRONMENTAL CONDITIONS

Do not apply tile in an environment or area with a minimum temperature of 10 degrees Celsius or above. Maintain the ambient temperature above 10 ° C while working and for at least 3 days after the laying is completed. Do not use starch or adhesive in uncovered areas.

If the weather conditions are particularly difficult, or when they are considered unsuitable for work, the contractor should continue laying and protecting the floor with ropes, napkins, raincoats, etc. and if they are not sufficient, the suspension of work must be done with the approval of the supervisor.

In hot climates the bedding should be kept moist / wet to avoid accelerated drying of the layer under the tiles / mortar and cough. The working procedures and methodology must be coordinated and approved by the supervisor (implementing engineer), the excess amount of water can cause the mortar / cough to dissolve and consequently the resistance of the layer, with a definite time of detachment of the tiles. When laying the floor, the mortar layer is not allowed to increase the percentage of water and mortar to avoid the phenomenon of accelerated drying.

### 6.1.2 ADDITIONAL MATERIAL

Supply a 2% surcharge on each type of used tiles.

### 6.1.3 VAPOR BARRIER LAYER

Evaporating barrier should be a polyethylene sheet with a thickness of 0.50 mm, and with a vapor permeability greater than 2-100 m, with a tensile strength of 450%.

The sheets are obtained from pure, neutral or white particles, density Kg / dm<sup>3</sup> 0.95, dry placement based on one of the following procedures:

- with a passage of 20cm and return of 10cm in the vertical parts,



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- with a passage of 5cm, kissed with a single joint with a width of 8cm, 10cm return to the vertical parts.

Joints with all remaining parts of the joint strip - also to be used on vertical walls.

The partition layer will be an artificial blanket which weighs 300 g / m<sup>2</sup>.

### 6.1.3.1 Execution

Install the vapor barrier in direct contact with the roof surface. The vapor barrier should consist of a saturated asphalt strip. Lay a vapor barrier in the direction of the slope of the terrace. Layer to be placed inside plus minus 15 degrees C. The vapor barrier must be free of distortion or refraction. Push air bubbles to achieve full adhesion between surfaces.

At the corners of the walls and at other vertical exits, extend the vapor barrier 150 mm to form an alcove which will later be folded over the insulation sides of the vapor barrier.

### 6.1.4 WATERPROOFING WITH MAPEI LAYER OR SIMILAR

The waterproofing membrane will be selected in consultation with the supervisor of works in order to adapt to the specific conditions required. The contractor will bring samples of various certified, if they do not provide the characteristics required by the works supervisor will be rejected. All waterproofing materials must meet the conditions set out in normative.

Its thickness should be with a minimum of 4mm. Particular care should be taken in the preparation of waterproof surfaces. Any potential open points should be sealed with silicone or plastered. The waterproofing, realizing the overlap of the layers (minimum 12 cm), will be raised in a vertical direction with the side walls with a min of 10 cm.

The waterproofing layer will be fastened to the edge rails with threaded screws with rubber. It is suggested that the waterproofing layer provide absolute waterproofing against water and humidity. Must have light weight ( $\leq 200$  gr / m<sup>2</sup>) and high mechanical strength. Resistance to temperature changes (-40 ° C- + 100 ° C) and high fire resistance.

#### 6.1.4.1 EXECUTION

Mapei (or similar material) is a ready-to-use liquid waterproofing membrane, solvent-free and VOC-free.

Once applied, it forms a smooth membrane with an extension capacity of 400%, which is resistant to atmospheric agents, UV rays and accumulated water.

The excellent mechanical properties of Aquaflex Roof Premium remain stable over the years, which makes the product very durable.



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Aquaflex Roof Premium is easily applied by brush, roller or spray on horizontal, vertical and sloping surfaces and on complex shaped surfaces. The product dries very quickly and several coats can be applied in a very short time, reducing spot waiting times to a minimum.

### 6.1.5 POLYSTYRENE INSULATION LAYER

The floor insulation will be made of thick polystyrene panels as shown in the drawings. Must be made of high density polystyrene (XPS). Installation of plastic foam panels will be an external protection, as well as expand the use of gases in accordance with EU and domestic regulations for (CO<sub>2</sub>), thermal conductivity  $\lambda 0.033 \text{ W/mK}$ , Compression resistance  $\geq 3.7 \text{ kg/cm}^2$ , the coefficient of resistance to vapor dispersion  $\mu 160 \div 224$

#### 6.1.5.1 EXECUTION

The panels will have overlap on all four sides of the profiles to eliminate thermal bridges, water absorption  $\leq 0.10\%$  by volume. Fire response class, as well as technical durability for insulation of flat terraces DIN created and published by the Dutsches Bautechnik Institute.

### 6.1.6 IMPORTED GRANITE MARBLE TILES

All tiles used must be those that have been approved during the inspection of samples / models. Mixing tiles on walls or floors purchased from another factory in the same room is not allowed. All floor tiles must be anti-slip. Slabs shall not have lead content, as classified in group B1 in accordance with UNI EN 87 and meeting the parameters of UNI EN 176 standards, which consist of a single mass even if compact (non-compact) or treated on the surface, extracted by automatic cold or hot pressing of the paste resulting from the kaolitin coagulant. Inert materials or steel components must be very small in content. Baking temperature  $1200^\circ \text{C}$  Absorption of H<sub>2</sub>O  $\leq 0.05\%$  UNI EN 99 Bending strength 45-55 N / mm<sup>2</sup> UNI EN 100 Surface hardness 7/8 Mohs UNI EN 101 Resistance to chemical attacks in accordance with UNI EN 106 Frost resistance in accordance with UNI EN 202 Thermal and shock resistance in accordance with UNI EN 104 Color fastness to UV rays in accordance with DIN 51094 Resistance to deep corrosion 125-140 mm<sup>3</sup> UNI EN 100 Fireproof Technical data:

(A) Reference format cm 30x30

(B) Acceptability in% deviated forms according to those produced by the factory

(C) The center of curvature is related to the diagonal calculation of the factory dimensions

The paving of the tiles should be such as to preserve the very characteristics that the paving product itself can potentially give. Clean all stains or debris, dust that may have the surface also wet afterwards. Care should be taken during the preparation of the mortar to be laid (not to exceed the maximum thickness of 3-5 cm).



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While the minimum as follows:

Washed sand (3 max3 mm) - 1 mc,

Cement - 325 200 Kg,

Water- 80/100 lt.

Water content which is minimal but may vary depending on temperature, sand moisture, amount of chemical diluents added to the mortar. Mix the composition in another mechanical device (concrete mixer) to achieve the perfect mixture and use it in a very short time to obtain its bonding capacity. It is advisable to limit the excessive opening of the cough so that the porcelain or stone tile sticks to the wet cough.

Use vibrating devices to make the cough more compact and expel excess air. Sprinkle with 325 cement in the amount of 5-7 kg per m<sup>2</sup> and wet before laying the tiles, in order to increase the adhesion between the tile and mortar. It is not necessary to wet the porcelain tile because it is not that there is so much porosity, but a quick dipping of the tile can do the job and remove the dust from it.

Lay the tiles next to each other, if a narrow environment is laid or use dividing crosses for the paint on a wider surface; the second method is more preferable in case of repair of the structure and allows a slight tolerance between the tiles also enables the placement of the tiles in line by means of cross-shaped spacers.

To press the tiles with a special rubber hammer or vibrator, the aim is to compress the mortar / cough to increase the contact between the mortar and the slab and to allow excess water or mortar / cough to escape. This process applies in case we raise the tile and 80 to 90% of the amount of mortar / cough remains on the tile. Ensure that the rubber mallet is always clean so as not to leave marks or damage where it has touched the surface of the plate.

Prepare the paint with organic cement-based materials, for example: mixture of resin and other thinners as well as adhesive solutions. The paint should be best cleaned between the tile cavities after 3-4 hours.

Cleaning the coating on tiles, paint and glue must be done in accordance with the requirements set by the tile manufacturer before it hardens permanently, a delayed intervention to clean the paint may require the use of solutions and acids creating their effects of vapors which may damage the paint or any chrome-plated metal object located nearby. Surfaces to be dried by water or accidental remnants of mortar stains can be removed after the phenomenon is over, carefully use low-concentration organic acids and after being initially moistened with clean water by means of a sponge. Expansion joints should be included, extending partly in substrates, for surfaces not





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exceeding 30 meters<sup>2</sup> as well as in addition to other structural joints. Small movements that have connections to existing support joints can be made by interlocking the elastic material that allows changes without creating the risk of breakage with or without cracks, provided that the movements do not exceed one-fifth of the slabs. Ripples as per 2 mm per linear meter in length will not be allowed. With the use of suitable adhesives the tiles can be placed on special surfaces such as plaster, plastic, metal, wood, fiber panels, on existing tiles or in all cases where the surface of the structure is slightly porous and where it does not provide us traditional bonding / welding points. Sufficient amount of cough / putty will depend on the type of substrate, the type of frame and which may require 2.5-4 kg / m<sup>2</sup> for wallpaper and 4-5 kg / m<sup>2</sup> for flooring; such consumption is much lower than a traditional garment which takes about 25-40 kg / mortar / cough. Assess the condition of the floor which should be completely flat without dust by assessing the angles of the walls, the degree of their texture.

Prevent the use of leveling solutions / putty for both walls and floors in case the paving surface is not sufficient in flat placement. Laying should be done on structures at least two months before delivery calculating the shrinkage of concrete 300-500 microns / meter. Remove and clean all traces of debris and dust from the surface with an abundant / vigorous brush and wet evenly with water and leave to dry.

#### 6.1.6.1 EXECUTION

Do not apply the laying of tiles before the hydraulic, electrical, ventilation and heating works have been completed and tested, as well as bathtubs, showers and the insulation system have been tested beforehand.

##### Preparation

Do not apply the floor tiles in the places where the wall tiles will be laid until they are laid. The layer must be selected to fit the subsoil layer.

##### Layers on the floor

Prepare the bed mortar where the tiles will be laid, before the tile adhesive is applied. Fill in floor areas that are not level. Place cross spacers when needed.

##### Prepare the mortar mixture

Measure the amount of mortar preparation material in the controlled container to ensure that the material masses are properly held and controlled - measuring the materials with a shovel is not permissible. Unless otherwise specified, the mortar mixture according to the quantities measured by volume is done in the approved mechanical mixer or in the mortar boxes. Water quantity control should be done in bulk and uniformly.



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#### 6.1.6.1.1 FLOOR TILES

Portland cement mortar: level or prepare layers according to instructions. Slabs should not be placed in cement mortar with a moisture content greater than 2%.

#### 6.1.6.1.2 WALL TILES

The surface of the wall to be placed ceramic tiles after the layer of mortar has been laid, which should have right angles, be level and not exceed 2.5 mm deformation per meter in a flat plane. Use Portland cement mortar or other type of organic adhesive.

##### Joints

Make a leveling, parallel, with bullets, leveling in a row. Place end joints and those in the center and between the tiles if possible, as long as applicable. Place straight plates with straight joints and those cut with cut joints. Guide binders should follow and be placed only on the mortar layer.

##### Width of joints

Joints should be uniform for laying tiles with a minimum of cuts but maintaining the standard to not allow confusion between the layers and the ceramic tile mosaic. Create joints as follows:

Tile placement: as defined for placement distance.

Non-slip ceramic tile: as defined in the partition spaces.

Stone slabs: 6 mm minimum and maximum width 10 mm

Cutting tools and units; according to the type and size of tiles.

##### Fillers and joints

Provide expansion joints and control during laying.

Apply expansion and control joints during laying as follows:

Install performance grout fillers or grout depth materials to ensure good insulation and connection.

Before filling, the joints should be open and clean, use paper or other materials to prevent them from clogging.

Once the plate filling is completely dry, remove the paper or other material as a temporary filler; clean the joints with a clean brush and or fill with insulating material.



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## Metal divider strips

Place metal separating strips on the mortar bed while the bed is in plastic condition. Place the partitions according to the instructions, in the right direction, with an unbroken line, flush with the surface and unfinished floor. Place partition strips where the floor tiles are limited to other types of paving, except for the spaces where the door sills are provided.

## CAPS

Place roofs overlooking the cuts on both sides of the opening. Place the sills on the cement bed properly with the floor mortar.

## Fixing the connecting joints

The joint between the floor or wall tiles and their fixing (eg in the bathroom) must be impermeable to water, as well as elastic, unless otherwise specified. Floor tiles should be surrounded by tiles and have a slight slope.

## Elastic joints

Elastic joints should be placed at all points where the pipes pass, underground or below other materials. Elasticity joints should also be provided where the pipes turn. Joint roofs should be glued at all points using adhesive tape. The joints must be clean of filler deposits. The fillings in the elastic joints must match the tiles and the surrounding materials. In the case of stairs, elastic joints must be provided between the stair treads and the plinths.

## Climbing down the fasteners

Provide climbing under bathtubs and shower tiles.

## Dressing in wet areas

When tiling in wet areas, care must be taken not to leave gaps in the layers where they will be placed.

## Geometry of the laying motive

In general, the laying of tiles will be determined in parallel with the laying of the walls, unless otherwise specified. Where possible, floor tile joints should be continuous with wall joints. The contractor must confirm his intentions with the Supervisor of works before starting the laying of tiles. If the plates are spherical from below then we must consider that all the others have taken the same direction



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Using tile cut pieces

Only pieces larger than half the size of the main tiles can be used. The use of small pieces as tile fills should be avoided.

Expansion joints - Expansion joints should be placed every 4 meters.

Cutting corners - All visible corners on wall tiles should be cut with a cutting element, only if the edges have smooth tile specifics. Plintuse gres importi, h = 10cm

#### 6.1.7 IMPORTED GRES TILES, h=10 cm

Equipment and installations will also include siding (plinths) with 10 cm gres tiles of the first category excluding any sub-selection, color and size selected by the Supervisor of Works, with the same details as with the floor tiles.

No sample should have another alternative.

##### 6.1.7.1 EXECUTION

The tiles should be glued to the floor with cement mortar with adhesive types suitable for the location of the floor (internal or external) and compatible with the way of support on which the tiles are glued. The adhesive should be brought to the construction site inside sealed envelopes, approved by the Supervisor of works. Necessary joints to be filled are those of displacement and against sunburn; especially along the perimeter boundaries between the ceilings and the floor and any other protruding structure. A waterproofing protection should be applied after installation and cleaning. The layer should be applied during the connection of the joints and the grout should be realized with plastic cement products approved by the Supervisor of Works.

#### 6.1.8 FACADE WITH TILES ACCORDING TO THE ORIGINAL MODEL

Partial tiling on the exterior walls of the building. Damaged tiles on the facade will be replaced with other tiles of the same dimensions, color and material as the originals.

##### 6.1.8.1 EXECUTION

Facade tiles are ceramic therefore the working methodology is the same as those of interior floors.

#### 6.1.9 CONCRETE REINFORCING SLAB

Self-compacting concrete slabs, 50 mm thick, with quartz surface and resistant to industrial flooring consisting of a concrete conglomerate of guaranteed quality, exposure class XC1-XC2 and minimum resistance minimum Rck 30, reinforced with mesh consisting of steel rod with a diameter of 6 mm



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and FeB44k mesh 20x20 cm. The coating has a resistant surface which is composed of corundum quartz mineral aggregates, special types of solution, oxidizers and dyes of the classification 5 kg / m<sup>2</sup> (paint according to the supervisor's instructions).

Also, this floor must provide a certain coefficient of friction, as well as must meet the construction standards for the elimination of architectural barriers in buildings, public spaces and community service places.

This process will include slopes, deep cuts and PVC joints which form a 4x4 m element and however do not exceed 20 m<sup>2</sup>, the extension of polystyrene insulation strips of 10 mm, in the perimeter walls with the necessary protection up to 1 m height, placement of steel gutters in accordance with the thresholds, laying of the final sand, painting with suitable detergents, as well as construction of the system and water drainage channel.

In case of using two-component polarite adhesive, the tiles must be completely dry; if you use cement-based adhesives there is no need to wet the tiles before laying (just wash them in clean water when they are too dusty).

Spread the adhesive on a small surface (about 2 m<sup>2</sup> for each layer) and then place the tiles on the still fresh putty using a good commodity. In case the putty / adhesive has formed an easy membrane to be removed using a spatula. To place the tiles corner by corner during the laying of narrow spaces as well as the appropriate spacers in the shape of a cross according to the space.

Minor alignment defects, such as teeth or uneven spacers can be corrected within the adhesive clotting time. Place the paint between the tile spaces with the right thickness.

#### 6.1.9.1 EXECUTION

##### Tile cutting equipment

Enable proper tile cutter for work. To be provided according to the instructions to complete and complete the laying of tiles. Provide bolts and wooden heels, except when wooden heels may affect the surface of the wall tiles. The inner corners should be square and the outer corners should be rounded using the proper cutting device.

Aggregates - The sand for the preparation of the mortar must pass through a sieve 16.

Water - Clean and transportable ..

Portland Cement - White for gluing and gray for other uses.

Separating strips of metal



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With heavy terrazzo tip, made of brass or zinc alloy, about 2 mm by 6 mm thick and depth equal to the thickness of the tiles plus placement in the plinth.

Plintuset-thresholds

Strong and ample marble for paving within a minimum of 25 mm thick for paving and 13 mm thick for thin paving, unless otherwise instructed. Rounding of angles is done for breach flow. While he tarred for outdoor exposure. Slope of vertical edges maximum up to 13 mm in height, or according to instructions.

Mortar for laying tiles

Portland cement mortar

Dry set of Portland cement mortar mixed at the factory ..

Organic Adhesives - The use of organic adhesives is limited in wall applications

Filler - Portland Cement,

- Portland cemented sand

- Frame for tiles and filling

- That do not leave stains

- Neutral to the environment

## 6.1.10 TECHNOLOGICAL FLOOR

Technological floor is produced from calcium sulfate and with the addition of cellulose fibers, made from sorted paper and recycled cardboard. Letters soak in large tanks. After timely processing they mix with treated water and mortar creating a smooth mass. This mass is placed on a conveyor belt, reaching a thickness of 2 mm by suction of excess water with vacuum. The formed cylinder is worked by pressing to the required thickness, cut approximately and, after a period of dry placement, dried in 12 layers. Large panels are sanded, and shaped into a formatting station to make panels. After the final finishing of the panel on the top and back, the latter are packed in pallets. This type of production of gypsum fiber material, ensures unique density homogeneity throughout the thickness of the panel. Technological floors consists of reinforced calcium sulfate fibers preferably applied to a foil at the bottom. The panels are protected from shock and moisture from the side contour on all sides. The structure consists of zinc-coated steel pedestals of varying lengths as needed.

Panels



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Technological floor panels are composed of calcium sulfate and are durable and easily adaptable. The support elements of these panels are created exclusively for technical floors. The main elements that make up the panels are high quality gypsum and cellulose fibers.

#### Bearing capacity

Various measurements have been made to achieve high durability without increasing the panel thickness. To increase the bearing capacity of the material, steel sheet placed from the bottom of the panel is used.

#### Fire protection

Technological floors offers excellent fire protection, careful selection of materials provides fire resistance up to 60 min (Fire resistance performance F60, REI 60) The panel holder is non-flammable.

#### Earthing resistance

Calcium sulfate panels are produced with conductivity using very good conductive materials such as coatings, adhesives, side contour. The electrical discharge will continuously discharge to the ground. Anyway a good floor covering should be chosen.

#### System weight

The weight of the system varies from 37 kg / m<sup>2</sup> to 84 kg / m<sup>2</sup>, depending on the bearing capacity requirements.

#### System height

For heights greater than 50 cm horizontal reinforcement with straps is recommended.

#### Pedestal

The pedestals are made of galvanized steel and are variable in height as needed.

#### Acoustic insulation

Acoustic insulating joints are made of conductive / non-conductive plastic material. They support the optimal placement of the panels and at the same time make the acoustic insulation due to the data of their plastic material.

#### Climbing pedestals

Gluings pedestals to the floor is done with adhesives of different types depending on environmental requirements.

#### Connection to the walls

The connection to the wall is made through a plastic cork which supports horizontal movements and at the same time makes good acoustic insulation.

#### Existing floor

As a rule, the existing floor should be covered with a layer in order to ensure the best possible connection of the pedestals with the structure.





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### Suitable floor coverings

Elastic textile covers are very suitable for technical floors, tiles, parquet etc. are also suitable

### Carrying capacity

The permissible carrying weight is calculated and tested with the involvement of official instances .The final results are presented in a certificate of conformity of the standard DIN EN 12825.

### Point loads

To determine the point load, a load is simulated such as the foot of a table. Based on the allowable point load, the system generally determines the appropriate load. In line with standard practice, the load is applied with dimensions 25mm x 25mm.

### Distributed load

Like point loads, the distributed load is a static charge. In contrast to the point load the surface of the force applicator is 1m2.The term distributed load is widely used in the field of structural engineering. Used to determine the strength of reinforced concrete floors. For technical floors, the specified load specification is not appropriate. For practical purposes, the 1m2 applicator is applied to the technical floor grid (60cm x 60cm) on each panel. The panel and the pedestal, play the role of the intermediate layer, transferring the load to the concrete floor.

To determine the permissible dynamic load of the vehicle (eg fork machines) the following must be taken into account:

- Vehicle weight without load
- Total vehicle weight and load
- Wheel loads
- Tire contact surface
- Contact surface
- Maximum vehicle speed
- Number, diameter, width of tire material
- Maximum vehicle to increase or decrease speed

### Security factor

A safety factor will be set depending on the static load (allowable weight of the vehicle) using the above mentioned factors and multiplying them by the maximum allowed static weight. When choosing a floor covering, make sure that the cover and the adhesive are suitable for these specific requirements

### Load carrying capacity

Static values are according to DIN EN 12825. The European standard for technical floors EN 12825 describes a test system for panels and pedestals to identify the maximum load and relevant classifications. The load is transferred to the system using an applicator test with dimensions 25 mm x 25 mm which means with an area of 625 m2.Load points must be checked. The failure criterion shown in the classification below is vertical break and displacement with nominal load and class load.



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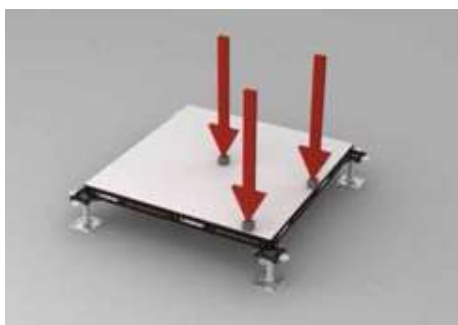


Class <sup>1)</sup>	Breaking load <sup>2)</sup>	Nominal load <sup>3)</sup>	Element class <sup>4)</sup>	Applications and usage scenarios
1	≥ 4,000 N	2,000 N	1	Offices without public access and without heavy equipment
2	≥ 6,000 N	3,000 N	2	Office areas with public access
3	≥ 8,000 N	4,000 N	3	Rooms with increased static loads
4	≥ 9,000 N	4,500 N	-	Areas with fixed seating, design offices
5	≥ 10,000 N	5,000 N	5	Exhibition areas, workshops with light use, storage rooms, libraries
6	≥ 12,000 N	6,000 N	6 <sup>5)</sup>	As with load category 5,000 N, but with increased load requirements, industrial and workshop floors, vault rooms
-	≥ 14,000 N	≥ 7,000 N		Heavy duty floors, production areas, such as clean rooms

To determine the breaking point the load is applied to the weakest point of the panel, as illustrated below using an applicator with dimensions 25 mm x 25 mm which increases the load until the breaking point is reached. (Fig. Below)

Nominal loads and loads by class are determined according to the guide for application on technical floors.

Higher nominal loads are required in the case of technical floors which must carry heavy weights.



For a load at the nominal load level (which is the load leading to panel breakage divided by the safety factor), the measured vertical displacement shall not exceed the value given in the table below.

Class	Maximum deflection
A	2.5 mm



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B	3.0 mm
C	4.00 mm

International standards describe the testing of components for classification according to load classes. Panels for technical floors and pedestals are tested and classified individually. Apply maximum load to the panel using the 25mm x 25mm applicator. The load points shown in the figure will be tested. The technical floor panel will be supported on solid cylinders. The failure criterion is the breaking point of the panel and the vertical displacement by 2mm ( $l / 300$ ).

Class <sup>1)</sup>	Breaking load <sup>2)</sup>	Nominal load <sup>3)</sup>	Deflection <sup>4)</sup>	Applications and usage scenarios
1	$\geq 6,000$ N	3,000 N	max. 2 mm	Offices with a high proportion of communication equipment, telephone exchanges, engineering offices, auditoriums, training and treatment rooms
2	$\geq 8,000$ N	4,000 N	max. 2 mm	Computer rooms with more demanding requirements, print rooms, industrial floors with light traffic, storage rooms, workshops with light use and libraries
3	$\geq 10,000$ N	5,000 N	max. 2 mm	Computer rooms with more demanding requirements, print rooms, industrial floors with light traffic, storage rooms, workshops with light use and libraries
4	$\geq 10,000$ N	$> 5,000$ N	max. 2 mm	Floors with forklift traffic, industrial and workshop floors, vault rooms

#### Load classification

To determine the load leading to breakage the load is applied to the weakest points as in the illustration below, using an applicator with dimensions 25 mm x 25 mm, which increases the load until the breaking point is reached. The nominal load is determined by the breaking load divided by the safety factor  $\nu = \min. 2$ . Where the panel is loaded with the nominal load, the maximum vertical displacement should be  $l / 300$ .

#### Fire protection

Technological floor is suitable for use in fire hazardous areas thanks to its fire response performance A1 according to standard EN 13501-1. The system has the Classification F 30- AB / Rei 30 according to the standard DIN 4102-4 respectively EN 13501 – 2

#### Acoustic insulation



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1- Reduction of sound pressure impact  $\Delta L_w$  tested according to DIN EN ISO 140-8

Measurement with laboratory tests is done vertically eg from floor to floor with standard ceiling allowing comparison between different systems. High values are the most favorable.

2- Reduction of noise measured with R index tested according to DIN EN ISO 140- 3 standard

Measurement with laboratory tests is done vertically eg from floor to floor with standard ceiling allowing comparison between different systems. High values are the most favorable.

3- Normalized side impact according to noise pressure at level  $L_{n, f, v}$  tested according to DIN EN ISO 10848-2

Laboratory tests perform the measurement horizontally in combination with the acoustically well-insulated partition wall which hangs from the ceiling and touches the surface of the technical floor. The lowest values are favorable

4-  $D_{n,f}$  side impact difference, tested according to DIN EN ISO 10848-2

laboratory measurements are made horizontally in combination with the acoustically well-insulated partition wall which hangs from the ceiling and touches the surface of the technical floor. The highest values are favorable.

Seismic safety

Earthquakes are in most cases the result of seismic activity of the movement of the subsoil. There is never certainty for seismically active areas when an earthquake will occur. This constant hazard status makes it necessary to carry out continuous measurements in order to achieve global security. Technological floor panels are approved for the safety they provide in case of disasters.

Earthquakes are classified into magnitude scales of which the most famous is the Richter scale. Geographical division of risk areas is shown on maps. The map shows that despite the most endangered areas located in Asia and the American continent, some areas in Europe such as Germany are seismically active. There are consistently several regulators in the construction of construction standards according to Eurocode 8: DIN EN 1998-1: 2010-12 for seismic safety in buildings. Eurocode 8 seismic safety requirements are also valid for building class 1 and must be maintained as part of the baseline data in case of emergencies.

Suitability of technological floor systems for categories A-F according to IBC (International Building Code).

From design requirements in low-risk areas to design requirements for high-risk areas, with acute risk to human life in buildings, was verified in cooperation with the Institute of Earthquake Engineering and Seismological Engineering in Skopje.

#### 6.1.10.1 EXECUTION

Every building material, every building element and every structure (construction) change their dimensions depending on the climatic conditions. Also deformations of building parts (e.g. permitted deviations) and building structure (e.g. structural reductions) are generated by permanent structure loads and temporary loads. For this reason, joints of floor panels are necessary and must be planned. Bonds should be placed where the potential for cracks is foreseen.



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When installing piping below the technical floor, the impermeability of the system must be ensured. The following values are confirmed by the German institute "Institut für Systembodentechnik" with report no. 04 / 535BS:

Influencing factors

VI = Air duct volume per unit length

a = Permeability coefficient

$\Delta p$  = Pressure difference testing

To optimize the air flow coefficient for the technical floor system, it is recommended to use non-fixed tiles

Test results:

- Wall connection with adhesive aw ----> permeability coefficient of joints aw =  $0.27 \text{ m}^3 / (\text{h} \times \text{m})$

- Connection to the wall with adhesives and straps, connection length 6.0 m ----> aw  $0.27 \text{ m}^3 / (\text{h} \times \text{m})$

- Connection to the wall with airproof adhesive; test of connection of joints between technical floor aD; joint length 4.2m ---> Permeability coefficient aD =  $0.04 \text{ m}^3 / (\text{h} \times \text{m})$

Static electricity:

Static electricity is a natural phenomenon familiar to the general public, for example when you are electrocuted by door handles after walking on carpets. These electrical discharges are usually harmless, but from the disturbance caused to the persons uncontrolled movements can be made. In addition we can say that there are consequences from static electricity which can be eliminated. Testing procedure for electrostatic data Resistance measurements, parameter measurements  $\Omega$  (ohm) Most tests take place in certain climatic tests which however are not the same in different standards.

Contact resistance

(R1 - Procedure A - DIN EN 1081)

Electrical resistance is measured in a sample between an electrode tripod placed on a floor covering surface and an electrode placed directly opposite on the inside.

Resistance to soil

(R2 - procedure C - DIN EN 1081)

Electrical resistance is measured on a floor installed an electrode tripod placed on the floor and ground potential.

Surface resistance:

(R3 - Procedures C - DIN EN 1081)

Electrical resistance is measured in a floor covering installed between 2 electrode tripods placed 100 mm apart.

Continuity with land: (Rst DIN 5700 / VDE 0100 T-10)

The resistance is measured between the surface of the installed floor and the ground.

Measurement of discharges; parameter measurement in kV (kilovolts)

Walking test (DIN 54345, T2)



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The trigger voltage is measured by walking on the installed floor of a person wearing special footwear.

Technical test (DIN 54345, T3)

The test mentioned above is simulated with a machine. This test is performed in only one laboratory.

#### 6.1.11 POWER TROWEL FLATTENED QUARTZ CONCRETE 5 CM

**Scratch & Abrasion Resistance:** has high levels of resistance. Technological Quartz is highly resistant to scratching, staining and dirt, as well as water and humidity. **Impact Resistant:** Great flexural strength and impact resistance. **Hygienic:** Practically zero porosity, preventing the absorption of water or other liquid. Consequently, the technological quartz does not need antibacterial chemicals, since the absence of pores prevents bacteria acting as a natural bacteriostatic. **Easy to Clean:** For periodical maintenance of the Technological Quartz materials, due to their exceptional physical and chemical characteristics, it is only needed a regular cleaning with a neutral pH product soap/detergent, rinse with water and dry with a dry microfiber cloth or absorbent paper towel. To eliminate any remains or residues from the technological quartz surface, just wipe with a damp cloth soaked with neutral pH detergent, rinse with water and dry it.

Features:

High hardness and resistance to abrasion and scratching/ Great flexural strength and impact resistance/ Heat resistant/ Easy to clean and maintain Environment friendly Minimal water absorption/ Maximum durability

MPN:	- (23431)
Length:	
Width:	
Thickness:	20mm
Edge Profile:	
Material:	Quartz Blend
Finish:	Concrete
Pattern:	Concrete Ice

The basic process is:

- add the 'sparkle' substance as aggregate (glass is a typical option)
- pour concrete





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- after concrete sets, you use a diamond grinder to expose the top layer of aggregate

It is all in the aggregate. There are many options depending on the look. A considerable quantity of aggregates are added to the concrete mix (appropriately coloured, and including performance-enhancing additives such as metakaolin or ground granulated blast furnace slag). Then the aggregate is raised by floating the surface while it's still wet. Once it's dry and hard and at least a week old (preferably a month old), you grind the surface down a millimetre or two to expose more of the aggregate. Then polish and seal with sodium silicate.

## 7. WORKS OF PLASTERING AND COVERING

### 7.1 GYPSUM CLADDING

#### 7.1.1 WALL CLADDING W623 1 X 12.5 MM AQUAPANEL LESH GURI 40 KG/M3 50MM

Moisture gypsum board (classification DIN 18180 GKI) for indoor use, 12.5 mm thick,  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  core composition, with special water absorption reducers,

the dressing must meet the following parameters:

Fire response class EN 13501-1: A2-s1, d0,

Evaporating factor resistance  $\mu$ : 10 (dry), 4 (wet),

Thermal conductivity  $\lambda$ : 0.20  $\frac{\text{W}}{\text{mK}}$ ,

Density:  $\geq 760 \text{ kg / m}^3$

Plate weight:  $\geq 9.5 \text{ kg / m}^2$ ,

Load bending:  $\geq 550 \text{ N length and } \geq 210 \text{ N transverse}$ ,

Absorption of water, after two hours of total immersion should not weigh more than <10% of the initial weight of the tile.

#### 7.1.2 GYPSUM COATING

Equipment and installations of wall cladding with double gypsum board total thickness from 125/250 mm (according to drawings) consisting of a galvanized metal structure of steel profiles with thickness (6/10 in perimeter, guide in the form of "U" 50 / 70/100 mm thickness and vertical profiles "C" 60 cm mutual distance), in which the gypsum boards are screwed; each plate / table will be not less than 12.5 mm.

##### 7.1.2.1 EXECUTION

Mounting on metal structure

Follow the ranking according to the actions for application:





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The parts should be placed in a flat place and insulated with thermal coating and magnetic level and apply the insulation with non-plastic insulating materials to the metal profiles of the perimeter (in both "U" and "C" profiles by joining them. with hinges, screws, nails;

Check the alignment position with a twine; if the surface where you are installing is rough as tiles / bathroom / kitchen place a layer of bitumen or polyethylene under the metal profiles with a vertical height of 2 cm to completely protect the profiles and gypsum board from water penetration

Place the profiles "C" (with a length of about 1cm between the guides in the shape of "U") however oriented in the same direction, first place those that are positioned in the door frames or those that will be placed between the two walls, join them on rails at the predetermined distance;

Lay the tiles (at the same height as the room 1 cm above the floor) in order to place and match between the tiles glued along the metal spacer in the shape of a cross (metal cross placed between two layers of glass, gypsum to provide a certain distance between two surfaces) , the joint must be arranged in respect of the other arm as well, as a double plate, the joints / welds must be made equally on both plates; horizontal joints / welds should be arranged on both sides. Slabs should be tightened with screws not less than 1cm from the longitudinal roofs and 1.5cm from the transverse roofs, the distance between the screws will be 30 cm on each slab on both sides of the frame, for double slab dividers, the first slab (e inner) will be screwed with screws 80cm at a joint distance from each other and the outer plate will be screwed at a distance of 25cm; Apply the insulating material (mineral wool / glass) by plastering the edges and the edges of the insulating frames. The final layer of skating should be used as a final layer with at least 5cm flowing on both sides, then an additional second layer should be applied to cover the first layer with a width of about 30 cm, after drying the whole surface should be sanded with graphite.

Installation accessories

In accordance with the different types of adhesive, different screws should be used: profile structure "C" pins or extension screws, metal plate spacer with phosphate screws with anti-oxidation head and triple tip, of different joint lengths, side plates head screws against rust with triple tip and directed in a spiral shape.

Metal accessories, screw, round, self-filling.

Protection of roofs and interior corners.

All internal roofs and corners should be reinforced and protected with protective tape or angle profiles, protective at the corners of the layers and along the sides.

joints

When gypsum walls meet with masonry and other similar elements or in case of large dimensions, with interruptions of gypsum walls (> 15 m2, presence of doors and windows to be opened) joints



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should be made from, 1/1, 5 cm wide, along the entire length and thickness of the wall. The end of the joints should be kissed deeply so that it is not visible with a suitable elastic material.

The application of joints can mean:

Quick setting of plaster powder / putty, easily gossiped.

Appropriate anchoring systems should be included to secure the bathroom fixtures.

Reaction to water.

For moisture and wet surfaces the waterproof coating must be used and be certified according to the specified conditions. Changing the humidity in the spaces where the anti-moisture coating panels will be placed should not affect the degradation of the material and the coating itself.

Shock resistance

The wall must withstand the shocks of a series of triplets of a body with a power of 250 J with an impact energy around (250 kilograms per meter) and a strong body 10 J, impact energy, maintaining the shape of the structure by not allowing the body to pass beyond clothing and not causing damage and falling to pieces that could cause accidental injury to any human. Testing procedures must conform to ICITE-UEATC standards.

Resistance to fixing and hanging equipment

The equipment to be hung and the wall itself must be able to withstand constant deformations and changes, as well as to have no visible damage, for a load of 100 kg which is placed in a parallel at a distance of 30 cm from the platform and distributed on a surface with a lateral direction of 50 cm. Testing equipment must be provided by the factory providing the materials.

Resistance to heat radiation.

The gypsum board must be stable without visible and permanent alterations and deformations or partial damage in shape, appearance, as well as cracks caused by the radiation energy of a 250 l lamp.

Double panel gypsum coating

Standard gypsum boards, double panel (classification DIN 18180 GKB) for indoor use (in Godina) must have the following parameters:

Fire response class EN 13501-1: A2-s1, d0,

Resistance to evaporating factor  $\mu$ : 10 (dry), 4 (moisture),

Thermal conductivity  $\lambda$ : 0.20  $\frac{W}{mK}$ ,

Density:  $\geq 680 \text{ kg / m}^3$

Slab weight:  $\geq 8.5 \text{ kg / m}^2$  for 12.5 mm thickness,  $\geq 13.3 \text{ kg / m}^2$  for 15 mm thickness,



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Bending by load  $\geq 550$  N longitudinal and  $\geq 210$  N transverse for 12.5 mm thickness,  $\geq 650$  N length and  $\geq 250$  N transverse for 15 mm thick.

Prefabricated gypsum board with high efficiency (classification DIN 18180 GKFI), 12.5 mm thick for indoor use (in the building) must have the following parameters:

Fire response class EN 13501-1: A2-s1, d0,

Evaporating factor resistance  $\mu$ : 10 (dry), 4 (wet),

Thermal conductivity: 0.25  $\text{W} / \text{mK}$ ,

Density  $\geq 1000$  kg / m<sup>3</sup>

Plate weight: around 12.8 kg / m<sup>2</sup>,

Load bending:  $\geq 725$  N length and  $\geq 300$  N transverse,

Surface hardness  $\leq 15$  mm  $\varnothing$ ,

Water absorption capacity:  $\leq 10\%$ .

## 7.2 MARBLE STAIRS T = 3 CM

First quality stair marble of the selected type, including:

- gluing the tiles is done with a layer of cement chandelier 2cm,
- cutting with tile cutters and embedding the inlays in the wall, placing in the work in a completely compressed way between them and plastered with cement paint in the joints,
- washing and cleaning,

Samples of marble tiles must be submitted to the site supervisor for prior approval, as well as in consultation with the architect.

### 7.2.1 EXECUTION

Do not apply the laying of marble stair tiles in the places where the wall tiles will be laid until they are paved. The layer should be selected to fit the subsoil. Prepare the bed mortar where the tiles will be laid, before the tile adhesive is applied. Fill in floor areas that are not level. Measure the amount of mortar preparation materials in the controlled container to ensure that the material masses are properly held and controlled - measuring the materials with a shovel is not permissible. Unless otherwise specified, the mortar mixing according to the quantities measured by volume is done in the approved mechanical mixer or in the mortar boxes. Water quantity control should be done uniformly.

## 7.3 WALL CLADDING W623 2X 12.5MM GKF

Height 4 m; Width 70 mm; Coating: Double plate GKF 12.5mm.



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Gypsum wall W 623/70 mm with simple metal structure (CD UD) and double tile cladding

(fuel at an altitude of 4.00m). Installation of wall cladding with a metal construction and cladding with two gypsum boards with a total thickness of 70mm. The metal structure will be realized with galvanized steel profiles with classification EN 10327-10326 with thickness 0.6 mm and dimension of profiles:

- Horizontal profile UD 27x28x27 mm

- Vertical profile CD 27x60x27 mm, Located not more than 625 mm integer distance to

insulated from concrete structures with rubber band with acoustic interruption function, with special 3.5mm.

Profiles must be marked CE in accordance with European norms EN 14195 for "Profiles for Coated gypsum board systems", class A1 fire response, manufactured according to the quality management system EN-ISO9001-2000.

The coating will be realized with two layers of gypsum tiles, marked CE according to normative EN 520 and conform DIN 18180, GKF (F13), tested from the biological-construction point of view according to the certificate issued n. , fire reaction class A2 s1 d0 (non-combustible), fixed to the metal structure with phosphorescent self-tapping screws.

The plastering of the joints will be done in the first layer of gypsum with a doere without using fiberglass gauze and in the second layer with two hands with fiberglass gauze. For the protection of the outer corners, aluminum angular elements will be used as needed, which are fixed and plastered.

## 8. DOORS AND WINDOWS WORKS

### 8.1 S.I. SSYTEM SCHUCO ENCLOSURES, ACOUSTIC AND THERMAL DAOUBLE GLAZED

This is the Schuco aluminum glazing system with high thermal insulation. (SI-super insulated). It is an integral part of products aimed at energy conservation, also offers safety, automation, elegant design and the possibility of high transparency.



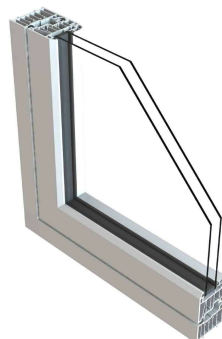
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Technical specifications:

Main Thickness	75 mm
Minimal Thickness	67 mm
Uf Value (>=)	1.3
Glass maximal thickness	57 mm
Opening	On the Side
External Surface	Anodized/Painted/Duraflon/Different Colors
Air Permeability	Class 4
Insulation(dB)	45
Water impermeability	9A
Shock Resistance	RC2
Wind Resistance	C5/B5

### 8.1.1 INSTALLATION

Install in accordance with the manufacturer's printed instructions and details. Build windows while work continues or install without force in prepared window openings. A strong aluminum substrate in galvanized tubular metal will be carefully placed with steel clamps on the walls using cement mortar (without screws). The clamps must have a distance from the corners of not more than 150 mm in a space of not more than 800 mm. The set window frame will be screwed to the substrate after all the mortar and grout work is done. Place the windows at the right height, location and exit; bullet, level and direction as well as grip to prevent breakage and misalignment. Install windows in a way that prevents the ingress of water and wind. Connect insect nets in place where specified. The opening of the glass panels will be with hinges on the frame and will be enabled by an anchoring system with three hinges and with a lock.

Using plastic-elastic materials, after each space is filled with insulating materials, the filling will be performed between the caskets and the building. On the inside of the tubular frame and the outer



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part of the aluminum to maintain an installation tolerance of 6 mm, considering an outlet of the fixing elements of about 2 mm.

## 8.2 S.I. PVC DOORS

-Supply and placement of doors in the building with a shutter, in color and dimensions specified in the project. Their selection will be done in consultation with the architect, must be determined by the contractor, consisting of:

- Laminate case
- collection hinges with weight bearing depending on the weight of the fold calculated for 200'000 openings, counterclaims;
- Composition of bandages: Plywood or structural wood with 10mm compressor;
- Doard leaf laminate surface 10mm on each side, laminate frame with presser 100x50 mm on 4 sides, filling with DRS-SOUND-SUPREME-BOARD with presser 8-50 mm and density 500-900kg / m3, brave calculated for 200 ' 000 openings, automatic closing mechanism with 38db floor.
- security lock and key, brass gloves, and corresponding plate and mouthpiece.

All masonry work as well as any other equipment for finishing work perfectly.

Samples of the proposed items will be presented to the site supervisor for prior approval in consultation with the architect

### 8.2.1 INSTALLATION

The installation will be performed after the masonry works have been completed according to the manufacturer's instructions.

## 8.3 S.I. INTERNAL MDF DOORS

-Supply and installation of interior doors with a shutter, in color and dimensions specified in the project. Their selection will be done in consultation with the architect, must be determined by the contractor, consisting of:

- MDF case with 45mm pressure
- collection hinges with weight bearing depending on the weight of the fold calculated for 200'000 openings, counterclaims;
- Composition of bandages: Plywood or structural wood with 10mm compressor;
- Door surface MDF surface 10mm on each side, wooden frame with presser 100x50 mm on 4 sides, filling with DRS-SOUND-SUPREME-BOARD with presser 8-50 mm and density 500-900kg / m3, brave calculated for 200 ' 000 openings, automatic closing mechanism with 38db floor.



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-security lock and key, brass gloves, and corresponding plate and mouthpiece.

All masonry work as well as any other equipment for finishing work perfectly.

Samples of the proposed items will be submitted to the site supervisor for prior approval in consultation with the architect.

### 8.3.1 INSTALLATION

The installation will be performed after the masonry works have been completed according to the manufacturer's instructions.

## 8.4 S.I. METALIC DOORS

### 8.4.1 STANDART METALIC DOORS

The construction of the core will be with vertical steel rods. Doors will be 45 mm thick, unless otherwise specified, and will have perfectly flat faces.

Accessories

Ventilators / grilles

Internal Ventilators

Ventilators should be stationary and not allow viewing where provided. Ventilation sheets will be welded or fixed to the frame and the entire element will be joined to the door through the frames. Form 0.9 mm thick sheet from 20 sheet steel.

Exterior Ventilators

Ventilators must be Z-type inverted with a minimum of 30 per cent meshless openings. Ventilator sheets will be welded or fixed to a continuous channel frame and the entire element will be welded to the door to create a water resistant joint. Form hot-dip galvanized steel vents of the same thickness as the door face metal.

Frameworks

Provide frames around exterior and interior door windows as well as interior door vents. Provide non-removable frames on the outside of the exterior doors and on the side of the interior doorway.

Door Accessories

Provide, as far as practicable, locks, hinges, axles, and mechanisms of a cartridge, hinge, or mechanism, or similar to those of the manufacturer. Modify accessories as needed to provide the features shown or specified.





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Accessories should be designed to hold a weight of 1-1 / 2 greater than that of the door itself and fixed accessories should be free of deformations that would impede the operation of the door.

Hinges and handles must be made of steel.

#### 8.4.2 EMERGENCY FIREPROOF DOORS – DURASTEEL DD120 DOORS

Metal doors with fire resistance 120 min.

Door panel:

- Total width: 28 mm
- Material: 9.5 mm DuraStël panel
- Joining: Welding and right angle

Frame :

- Total frame depth: 60 mm
- 60x60x6 mm angular cutting spacer
- Joining: Welding and right angle
- Type and configuration: Single rebate / 3- side frame
- Threshold: 70x10 mm width MS tiles (FR15)

Refinement:

Frame and panel: Primer application, ready for on-site painting (P3)

Metallic Elements:

- The panel is fixed with the "3 ëay shoot bolt" mechanism, the set of handles and the lock.
- Plates, lateral and central hinges are held for each flap.
- Passive panel in the case of a double-leaf door, fixed on each side with cylindrical bolts or with "2- ëay shoot bolts"

Certification: BS 476: Part 22: 1987



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Technical Specifications	Ref	Single Opening	Calculation Example	Double Opening	Calculation Example
Structural Opening Width	A	A	900	A	1800 mm
Structural Opening Height	B	B	2100	B	2100 mm
Total Frame Width	C	$(A - 8 = C)$	892	$(A - 8 = C)$	1792 mm
Total Frame Height	D	$(B - 6 = D)$	2094	$(B - 6 = D)$	2094 mm
Door Panel Width	E	$(A - 25 = E)$	875	$((A - 30)/2 = E)$	885 mm
Door Panel Height	F	$(B - 35 = F)$	2065	$(B - 35 = F)$	2065 mm

#### 8.4.3 INSTALLATION

Standard steel frames

Form frames of the sizes and shapes shown, with welded or bent corners on the construction site.

Welded Frames

In welded frames, continuous welding is in the direction of the corner joint. Mechanical joining or continuous welding ends muffled. Flatten the entire welded part.

Folded Frames

To design corners for easy mounting in place through hidden rivets, joining plates, or joining joints that create a right angle, resistant corners and good kissing as well as to maintain the direction of the elements near them. Provide washers for bolted joints.

Vertical and Horizontal Partitions

The horizontal and vertical partitions of the door shutters must be closed or with a tubular construction and must be joined to the elements supported at the top and to the vertical wall but not fixed behind them. The bottom door divider should have floor-mountable adjustable brackets and side brackets.

Rails and Holders

Form rails and supports from 20 sheets with a thickness of 0.9 mm. Ensure sufficient for glass and other openings in standard metal frames. Secure the rails to the frames with self-tapping screws for Philips metal with oval head or with clamps and concealed fasteners. Place the clamps at approximately 300 to 400 mm distance 12 to the center. Cover the frame shapes in the corners. Cover or join at right angles to the right angle rails at the corners.



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## Frame Openings

Produce the frames for these openings with the same material, thickness and mounting as specified for the doors with metal frame, only that for these openings no preparatory work has to be done for the placement of accessories and doors.

## Anchors (wall door fasteners)

Provide anchors to secure the frame to the structure next to it. Provide steel anchors, with zinc coating or painted with anti-rust paint, no lighter than 1.2 mm thickness 18 size.

## Weather insulating tape

For the exterior, a black rubber band with clips for factory placement or in factory-created frame spaces may be placed, or a strip of neoprene foam made to fit into a continuous socket created in the frame.

## Isolation Cores

Isolated cores must be of the specified type, must provide the maximum coupling with a U value equal to 0.48

## Preparation of Accessories

Reinforce, drill and join doors and frames to be ready for accessory placement. Prepare doors and frames for accessories.

## finishes

Unless otherwise specified, provide equipment with heat-applied zinc coatings and factory-finished finishes. Next, apply two coats of varnish to the exposed surfaces. Dry or bake in the oven each of the spray hands. Requirements for drying time and temperature should be in accordance with the recommendations of the varnish manufacturer. The color of the finished refinish must match the color pattern that was approved.

## Quality of work

Finished doors and frames should be strong and flexible, clean in appearance and free of defects, corrugations, scratches, cuts, holes, deformations and adhesions. Elements placed in them with frames should have clear, straight and complete cuts, with well-formed joints with straight or angled joints, and thoroughly leveled. Welding or gluing joints should be smooth. The design of the door frame sections for use should be according to the wall construction settings. Joints of elements should be well formed and leveled.

## 8.5 S.I. ANTIPANIC HANDLES

Anti-panic handles will be installed on the main entrance doors, PW toilets and emergency exits.



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## 8.5.1 INSTALLATION

Follow the manufacturer's instructions.

## 9. PAINTING

### 9.1 FIRST QUALITY IMPORTED HYDROPLASTIC PAINT

#### 9.1.1 QUALITY ASSURANCE

The supervisor has the right to take samples of 0.5 liters of ink, randomly from the products provided on site and to test them to verify that the products either conform to the specifications obtained by reference or with the approved replacement. Products that do not comply will be removed from the site and replaced with new products that conform to the specifications received as reference or an approved replacement.

#### 9.1.2 QUALITY ASSURANCE

Inks must be in sealed containers which legibly indicate the specified contract number, designated designation, specification number or formula, portion number, color, quantity, date of manufacture, manufacturer formulation number, instructions manufacturers including any warnings and special precautions as well as the name and address of the manufacturer.

#### 9.1.3 ENVIROMENTAL CONDITIONS

##### 9.1.3.1 OUTSIDE PAINTING

Do not apply the paint to the surface if there is fog, rainy weather or strong sunlight. Creating shadows with covers etc. will be allowed only with the permission of the Supervisor.

##### 9.1.3.2 INSIDE PAINTING

Apply when the painted surfaces are dry.

Materials

Inks and dyeing systems must be finished so that all the various diluents and inks recommended by the manufacturer are included so that a complete system is enabled. Colors must be obtained from Project Specifications or approved by the Supervisor.

#### 9.1.4 MATERIALS

Inks and dyeing systems must be finished so that all the various diluents and inks recommended by the manufacturer are included so that a complete system is enabled. Colors must be obtained from Project Specifications or approved by the Supervisor.



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### 9.1.5 Execution

Apply the dyeing materials in accordance with the manufacturer's instructions.

Thoroughly work the grouting materials in joints, pits, and open spaces. Adjust damaged paints before applying other coats. Interior areas should be cleaned with a broom and dust-free before and during the application of the material and paints.

Drying time: allow time between the application of paint hands, based on the paint manufacturer's recommendation, to allow complete drying, and to avoid the problem of final adhesion. Enable each layer in specific conditions to get the other hand.

First Hands and Intermediate Hands: Do not allow first hands or middle hands to dry for more than 30 days, or longer than the manufacturer's recommendation, before applying other hands.

Follow the manufacturer's recommendations for surface preparation if the first or intermediate coats are allowed to dry more than what is recommended by the manufacturer for subsequent paint coats. Each coat of paint should completely cover the surface of the previous coat of paint, and there should be no noticeable change in the shadows of the subsequent coatings.

Finished Surfaces: enable finished surfaces without leaks, dots, potholes, brush marks and color changes.

Apply paint hands with approved brushes, rollers, or spraying equipment only unless otherwise specified. Spray areas where brushes do not reach, such as yours and other equipment.

Reduce the paints to the right consistency by adding fresh paint, except when dilution is mandatory for the type of paint used. Obtain written permission from the Supervisor to use diluents. The written permit must include the quantities and types of diluents to use.

Substrate Systems:

Apply paint hands which conform to the relevant specifications listed in the following points:

- Exterior Metal Surfaces
- Metal Interior Surfaces
- Exterior Concrete, Concrete Bricks, Fino
- Indoor Concrete, Concrete Constructions, Fino
- Wooden Exterior Surfaces



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#### - Wooden Interior Surfaces

Minimum Dry Paint Thickness:

Apply paints, first coats, oil paints, enamel, substrates and other coats to a minimum paint thickness of 0.0375 mm on each coat only unless otherwise specified. The thickness of the paint hands where specified refers to the minimum thickness.

#### - List of Used Products

The contractor must submit a detailed list of all hands and paints used upon completion of the works. This list should include, production, use, product reference, supplier & number of materials in charge to enable Recipient to reclaim materials for maintenance purposes.

#### - Reserves for adjustments

The Contractor shall submit to the Supervisor a reserve for each coat of paint used in the original color to allow for the correction of minor damage which may occur prior to delivery of the paint. These reserves are included in the Contractor's price only if the quantity required exceeds 10% of the original container or 10kg of powder paints.

### 10. VARIUOS WORKS

#### 10.1 PAINTING WITH OILY PAINT OF THE METALIC SURFACE

Inks and dyeing systems must be finished so that all the various diluents and inks recommended by the manufacturer are included so that a complete system is enabled.

Against rust, red lead oxide in boiled oil seeds, two coats

Enamel paint, (oil-synthetic enamel) for metal surfaces, two coats

##### 10.1.1 EXECUTION

Wipe all surfaces. Pressurized water cleaning can be used to remove loose layers and any other barrier material.

Galvanized surfaces only with oxidized Zinc products: clean with thinner, steam, or non-alkaline cleaning mixture.

Surface cleaning: clean the thinner and wash in accordance with the removal of residues from non-alkaline cleaning materials. Surfaces must be corroded.

The supervisor may require that multiple coats of rust protection paint be applied in different colors to enable the verification of the number of coats.



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## METAL OUTDOORS

Rust protection: 0.50 mm

Intermediate: half gloss 0.0375 mm

Last coat: half gloss 0.0375 mm

## METAL INTERIOR SURFACES

Rust protection - 0.050 mm

Intermediate: half gloss 0.0375 mm

## 10.2 S.I. SINK

Sinks should be provided in the toilet rooms and washing areas. Sink sets are sanitary equipment for washing hands, face, etc. Sink sets can be made of metal, porcelain, or in site. Sink sets should provide fast and large amount of water flow. They must be resistant to mechanical seals, corrosion and chemical agents. They should provide water insulation, acoustic insulation, and good conditions during operation and easy access for repair.

The sink set must be connected to the sewage discharge pipes (the connection will be made with a siphon type pipe). The above connection will be made with knots, type T, at 45 or 60 degrees. The connection of the pipes to the sink set must be with HDPE pipes (of the same characteristics as the other sewage pipes). The length should be 20 - 40 cm and the diameter should match the exit of the sink set.

The sink set will be connected to the drinking water system. The connection will be realized with two flexible pipes with length 30 - 50 cm and diameter OD = 1/2 ". The pipes will realize the connection of the valves with the pipes of the hot and cold water system.

Folding holder in Toilets for people with disabilities

- Solid steel construction with high quality chrome finish
- Can be raised in the up position, providing unobstructed access, the overall height in the up position is 910 mm
- The holder is conveniently placed on the arm
- Overall dimensions (in the down position): Length (wall depth) 775 mm x Width 100 mm x height 250 mm
- Stylish, easy to clean and perfect for people with mobility difficulties

Fixed holder in Toilets for people with disabilities





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## 10.2.1 INSTALLATION

All toilets must be mounted according to the location specified in the Manufacturer's standard and those specified in the drawings.

Once the installation is complete, provide an on-site inspection of all toilets to determine that all have been supplied and installed according to the attached details. Also, check the operation and adjustment of all toilets. Any discrepancies or malfunctions should be reported to the Supervisor immediately.

## 10.3 S.I TOILET

Sanitary porcelain toilet, wall hanging, white color / surface. Discharge water

Requirement: water-saving discharge with two options, adjustable for 3-4 liters. Left-right behind

Connections: Complete with internal cover and 1/2 angle faucet. Immediate closure

Galixhant. Complete with all accessories for installation.

Screw connection in installation.

Element, covered, including toilet connection set with sound protection set.

Toilet sets are porcelain sanitary toilets with porcelain materials in accordance with international quality standards ISO 9001, as described in the Technical Sketches by the designer. The EC type can be modern (alla frënga) of the dependent type. They will be placed in accordance with the Supervisor's requirements.

Toilet sets, modern type (alla frënga) will be well fixed to the metal frame on the wall with brass clamps and nuts and screw caps and screws, without creating cracks in the wall tiles. The WC set will be connected to the exhaust pipes before installation on the wall with brass clamps. The .C exhaust pipe can be either below the set or at the back of it. WC set with side discharge outlet should be 19 cm above floor level.

At the bottom of the collecting basin will be a pellet with a minimum diameter D = 90 mm. The top of the ew's can be oval or circular according to the requirements of the project and the type of EC set. The height of the toilet set, modern type, is 38-40 cm. They will be installed in accordance with the design and requirements of the Supervisor. Horizontal distance between sets of toilets and other sanitary equipment (sink, bidet, etc.) should be at least 30 cm.

Toilet sets should provide fast and large amount of water flow. They must be resistant to mechanical seals, corrosion and chemical agents. They should provide water insulation, good operating conditions and easy access for repair.

The etiC set must be connected to the sewage discharge pipes (the connection will be made with a siphon type ub). The connection of the pipes to the toilet set must be with PVC pipes (of the same



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characteristics as the other sewage pipes). Their diameter should be in line with the output of the WC set (usually their diameter is 100-110 mm).

The toilet set will be connected to the drinking water system. The connection will be made to a discharge box that can be installed directly on the toilet seat or on the wall (separate from the toilet seat). This will depend on the WC set. The discharge box will be installed at 1.5 m above floor level. The porcelain material discharge box will comply with the design and ISO quality standards with the requirements. The sewage pipe will be fixed to the wall every 50 cm.

All technical requirements of the supervisor to complete the first class work must be included. The connection of the toilet set to the sewage pipes must be done with special materials for PP pipes in accordance with the recommendation of the pipe manufacturer. The sample of the toilet set together with the quality certificate, certificate of origin, test certificate and warranty certificate will be sent to the supervisor for prior approval before the installation of the WC. Technical data of the toilet set (including toilet type, working pressure, manufacturer name, standards and year of manufacture) must be provided in the catalog. The supervisor may perform additional testing for mechanical and physical data.

### 10.3.1 INSTALLATION

All sanitary fixtures should be mounted according to the location specified in the Manufacturer's standard and those specified in the drawings.

Once the installation is complete, provide a field inspection for all plumbing to determine that all have been supplied and installed according to the attached details. Also, check the operation and adjustment of all plumbing fixtures. Any discrepancies or malfunctions should be reported to the Supervisor immediately.

## 10.4 SKYLIGHT MECHANISM FOR NATURAL VENTILATION

### Features

It is an extruded PVC window equipped with insulating glass, combined with a polycarbonate dome, available in transparent or opal version, which guarantees natural light, ventilation, energy saving and architectural integration.

The VELUX dome window is available in four models: fixed, INTEGRA electric opening, for access to the roof and for the evacuation of smoke and heat (compliant with UNI EN 12101-2).

The openable model, available in nine sizes, is controlled by the touch screen control pad, is equipped with a rain sensor for automatic closing and falls within Class 2 of burglary resistance.



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All domed windows can be combined with an internal pleated filtering curtain and an external awning that makes the rooms comfortable even on the hottest days, as it filters the sun's rays before they hit the window.

## Installation

Thanks to the ease of installation and its advanced functions, the dome window is suitable for any typology of building and can be installed on any roof with a slope between 0 ° and 15 °.

The combination of the two components (window and dome), in addition to natural lighting, allows to obtain interesting values in terms of:

- protection (from hail, snow and rain, thanks to the rain sensor);
- isolation (with a window transmittance of  $U_w 1,4$ );
- ventilation (via VELUX ACTIVE which manages the opening and closing of windows and curtains through an intelligent algorithm);
- light control (ensured by the presence of the internal and external curtain).
- acoustic isolation (Lia: 51 dB).

Excellent ratio between usable opening area and surface smoke evacuation (available in 1,600 sizes)

- It is possible to supply the element in large format up to 3x3 m
- It can be laid on any type of support substructure
- Possibility of partial or total ventilation
- EFC function activated with pneumatic or electrical system (24V)
- The pyrotechnic actuator with CO2 bottle remains intact in case of tests or activation malfunctions
- Resistance to high wind loads (WL 3000)
- With anti-fall grille or perforated sheet metal with foliage effect (optional)

## 11. SITE WORKS

### 11.1 HUMMUS LAYER 30 CM

The fertilizer will be 12 percent nitrogen, 18 percent phosphorus and 12 percent potassium (12-18-12) uniform in composition, with free flow and suitable for application with approved equipment. Fertilizer will be shipped to the designated place in bags or other convenient containers, each fully labeled, with the name, trademark or trademark, and manufacturer's warranty.

The arable layer will be obtained by stripping the surfaces within the construction limits. Any additional material will be from approved sources beyond the site. The arable layer provided by the Contractor will be land that has representative soil characteristics in the vicinity that produce grass growth. The arable layer will be, reasonably, free from subsoil, free of clay lumps, without shrubs, unacceptable grasses and other debris and will be free of stones, stumps and other



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objects larger than 5 centimeters in diameter. The workable layer will be evenly distributed and evenly distributed at an average thickness of 10 centimeters.

The arable layer will contain from 5 to 20 percent organic material according to the composition tests of the arable layer composition.

#### 11.1.1 EXECUTION

Fertilizer should be distributed along the area to be sown with seeds and at the rate of 800-1000 kilograms per hectare. It will be mixed with the soil by disc or other methods acceptable to the Supervisor. Distribution by means of approved sowing machines equipped to plant and distribute manure at the same time will be acceptable. Irregularities in the surface as a result of the fertilization process or other operations will be leveled before the seed planting operations have started.

### 11.2 GRASS SCARIFICATION

All works for seed will be done during the most favorable planting season according to the species specified, unless otherwise instructed in writing by the Supervisor. A planting method satisfactory to the Supervisor will be used, using hand-held mechanical planting equipment or other approved equipment. When delays in operations lead to the realization of work beyond the most favorable planting season for the specified species, or when due to drought, strong winds, excess moisture, or other factors, satisfactory results are unlikely to be achieved. , The supervisor may stop the works. Works will start only after the conditions are favorable again or when the approved alternative procedure or corrective measures enter into force. If, during the sowing of the seeds, or after the grass has grown, uncultivated areas are discovered, these will be replanted by the Contractor at no additional cost to the Authority.

#### 11.2.1 EXECUTION

The seeds will be sown either by hand or with approved planting tools at the rate of 25 grams per square meter. The seeds will be evenly distributed on certain surfaces. Half of the seed will be sown as the sower moves in one direction, and the other half will sow as the sower moves at right angles to the first sowing. Seed sowing will not be done when there is windy weather.

Immediately after the completion of planting operations, the entire surface will be compacted by means of approved equipment.

Upon completion of seed sowing, the surfaces will be protected from traffic or other uses by placing warning signs in various locations.

Water will be applied immediately after final compaction. Irrigation will be done at the rate prescribed for the specified seed types. With the instruction of the Supervisor, additional applications are made. Water will be supplied in containers that are equipped with satisfactory



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means for equal distribution of water at the specified rate. Irrigation will be done in such a way as to prevent erosion due to the application of excessive amounts, and the irrigation equipment will be of such type as to prevent damage to the finished surface.

Areas in need of fertilization will be determined by the Supervisor. Manure will be spread over a period when the grass is dry. The fertilizer will be according to the specified type and degree and will be applied to the previously specified mass.

The grass layer stabilization period will be in effect until the grass layer has been harvested twice.

The contractor is responsible for placing proper care of a layer of grass all over the seeded area. Harvest the planted area at an average of 3 centimeters, whenever the grass height reaches an average of 6 centimeters.

### 11.3 S.I WASTE DISPOSAL

Aluminium garbage bins will placed on the entire perimeter of the property of the museum

#### 11.3.1 EXECUTION

Waste disposal bins to be installes as defined in the technical drawings.

### 12. MUSEUM EQUIPMENT

Museum equipment will be determined on site based on the specific conditions required by each displayed object. All will be hermetically sealed, shock resistant, with anti-theft alarm sensor, air ventilator, and specific lighting for each object. Dimensions and heights will also vary based on the object to be exhibited, but some types of exhibitors with corresponding dimensions are listed below and are also shown in the technical specifications.

#### 12.1 EXPOSITORS

##### **SECURITY**

We recommend a management system that allows only classified and authorized management access to the showcases. For showcases where it is not suitable to install mechanical locks, we recommend electronic locks which can be remotely opened or closed. For showcases using electric open systems, the wirelessly controlled electric opening mechanism is configured with mechanical self-locking. Fingerprint recognition systems are also an option for opening showcases.

##### **ALARM SYSTEM**

Different alarm systems can be selected based on the level of security required for exhibits. Alarm or security systems such as door open sensor, movement sensor, glass break sensor, vibration sensors etc.



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## ***HUMIDITY CONTROL***

Poor management of humidity is one of the key factors that may cause damage to fragile or sensitive exhibits such as those comprised of fabric and paper. In order to keep humidity within a set constant range, we offer two options:

- Passive humidity control media in sheet or granulated form. These absorb excessive moisture in the air to control changes in humidity levels within showcases to ensure the humidity in showcases does not fluctuate.
- Active humidity control system. An electronic constant humidity control system can precisely control and maintain the humidity in showcases. Whether it is required to dehumidify or humidify, the electronic constant humidity control system works around the clock to ensure the humidity level is maintained throughout as specified for a particular exhibit.

## ***TEMPERATURE CONTROL***

A system can be independently installed to maintain a consistent temperature and humidity, and allow for precise control of the microenvironment within a specified volumetric space in a showcase. An external air conditioner can effectively control the temperature and humidity of the showcase.

## ***OXYGEN CONTROL***

A very low level of oxygen within showcases is maintained by injecting nitrogen into the interior showcase to displace the oxygen. This effectively prevents damage to the exhibits as a result of oxidation within the display chamber.

## ***HAZARDOUS SUBSTANCES CONTROL***

Pollutants in the air inside showcases such as bacteria, microorganisms, suspended particles, and special corrosive gases are the key causes of irreversible damage to exhibits. Adsorbents, activated carbon fabric and air filtration systems effectively reduce the concentration of the above substances.

## ***FLUORESCENT LIGHT***

Fluorescent light is the most common choice for uniform or general illumination due to its high color rendering and life-like colors. An extensive range of choices for different types of fluorescent lighting models and lighting temperatures are available and can come with intelligent or manual dimming. A fluorescent tube generates high levels of ultraviolet radiation, which can be filtered out by laminated glass diffuser layers or by using UV filtering film.

## ***LOW VOLTAGE HALOGEN LIGHTS***

General lighting or accent lighting can be achieved with low voltage halogen lighting. It allows the easy replacement of lens accessories, is dimmable, and you can choose the right angle of light by



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selecting different light sources and conveniently adjusting lighting positions. Special ultraviolet light filtration treatment is also required.

### ***FIBRE OPTIC LIGHTING***

This is the preferred choice for museum lighting. Fibre optic lighting became hugely popular after it was introduced to museums in the 1990s and has since become widely applicable. This is because fibre optic lighting systems offer many advantages. This type of system is composed of three basic components: a light source or light projector (a halogen light source, metal halide light source and LED light source are available), glass fibre optic harness and end-light fixture. The light source can be placed at a position outside the showcase and away from exhibits so the heat it generates will not affect the exhibits. The fibre optic harness is able to effectively conduct visible light while eradicating ultraviolet light; this means the resulting light does not contain ultraviolet light or heat. The number and position of end-light fixtures can be combined in any way so as to achieve the optimum lighting effect. You can easily adjust the angle, focal point and direction of light to meet the lighting requirements of exhibits of different types and sizes.

### ***LED LIGHT***

LED light sources can come in the form of light strips, spotlights or track-mounted spotlights. With the development and improvement of LED technology, the range of applications of LED lights has widened considerably. LED lighting's low electricity consumption, extremely long service life and wide variety of installations provides diverse exhibition applications.

Optimal temperature for relic conservation is 15?-25?, allow deviation of 2?- 5?

Recommended humidity range for relic conservation is 45%-65%, allow for a variation of 0-5%

Lighting system on display cases should also filter out harmful UV radiation. Fiber optic lights and LED lights would be optimal options.





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1	Type 2/ A2 or A3-Hermetically sealed expositor: 100% translucent glass, stainless steel base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 250 cm with variable length. Detailed specifications according to T.D, (250 X 60) X 250	7	Type1/ D 05-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (604x60) x 164
2	Type 3/ B2 or B3-Hermetically sealed expositor: 100% translucent glass, metallic base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 130 cm with variable length. Detailed specifications according to T.D, , (165 X 60) X 130	8	Type1/ D 06-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (420x60) x 164
3	Type1/ D 01-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (155x50)x160 + (210x50)x160	9	Type1/ D 07-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (148x70) x 160
4	Type1/ D 02 -Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (190x50)x160	10	Type1/ D 08-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (708x70)x164
5	Type1/ D 03-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (275x70)x160	11	Type1/ D 09-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (719x60)x160
6	Type1/ D 04-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (200x50)x200 + (160x50)x200	12	Type1/ D 10-Hermetically sealed expositor: 100% translucent glass, , wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (555x70)x160



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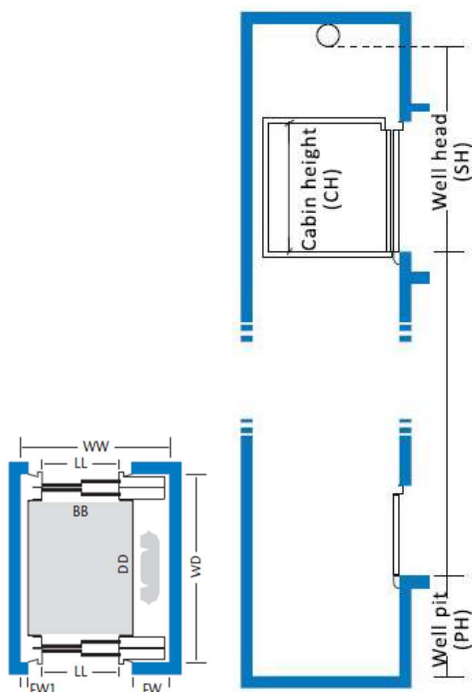
13	Type1/ D 11-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (210x50)x160 + (160x50)x160
14	Type1/ D 12-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (210x50)x160 + (150x50)x160
15	Type1/ D 13-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (GROUND FLOOR) / (200x50)x160
16	Type1/ D 14-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (FIRST FLOOR) / (255x50)x160 + (60x50)x160
17	Type1/ D 15-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (FIRST FLOOR) / (460x50)x160
18	Type1/ D 16-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (FIRST FLOOR) / (580x85)x160
19	Type 5/ D 17-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 280 cm with variable length. Detailed specifications according to T.D, (FIRST FLOOR) / (190x90)x280
20	Type1/ D 18-Hermetically sealed expositor: 100% translucent glass, wood base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D, (FIRST FLOOR) / (485x70)x160 +



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	(190x90)x280	Type1/ D 18-Hermetically sealed expositior: 100% translucent glass , woodbase resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 200 cm with variable length. Detailed specifications according to T.D. (FRST FLOOR) / (485x70)x160 + (515x50)x160
20		
21		Type 4/ (UNDERWATER ARCHEOLOGY)-Hermetically sealed expositior: 100% translucent glass, stainless steel cover base resistant to shocks, with specific lighting, anti-theft alarm sensors, air ventilator, cm h = 250 cm with variable length. Detailed specifications according to T.D. / (200x50)x250
22		Type 6, (UNDERWATER ARCHEOLOGY) /Hermetically sealed circular display: metal base and glass 100% translucent and shock resistant, with specific lighting, anti-theft alarm sensors, air ventilator, R = 27 cm h = 250cm. Detailed specifications according to T.D., Radius 27 cm
23		Type 7 (UNDERWATER ARCHEOLOGY) /Hermetically sealed circular display: metal base and glass 100% translucent and shock resistant, with specific lighting, anti-theft alarm sensors, air ventilator, Inner radius 45 cm; Outer radius 75 cm, h = 250cm. Detailed specifications according to T.D.

### 13.1 PANORAMIC LIFT (EXTERIOR)





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Technical Specifications	
Load (kg)	2500
Capacity (people)	33
Velocity (m/s)	1.6
Stops	3
BB (mm)	1800
DD (mm)	2700
Door Opening LR (mm)	1400
Door Height CH (mm)	2100
WW min (mm)	2490
WD min (mm)	3310
FW (mm)	720
FW1 (mm)	220
Pit Head SH (mm)	CH + 1850
Pit Well PH (mm)	1500

Recommended Options	
Fire alarm (FID)	upon operation via a belt from external detectors, the lift takes you to the main floor
Automatic Floor Return (EBD A)	in case of a power failure the cabin descends automatically to the nearest floor
Earthquake Contact (EAQ)	connected to a seismic detector that takes it to the nearest floor and makes it stand with the doors open
Malfunctioning signal (DAL GP)	Signalises in case of malfunctioning of the system
Cabin Light (OCL A)	timed shutdown of the light in the cabin to allow energy savings; automatic restart in case of call



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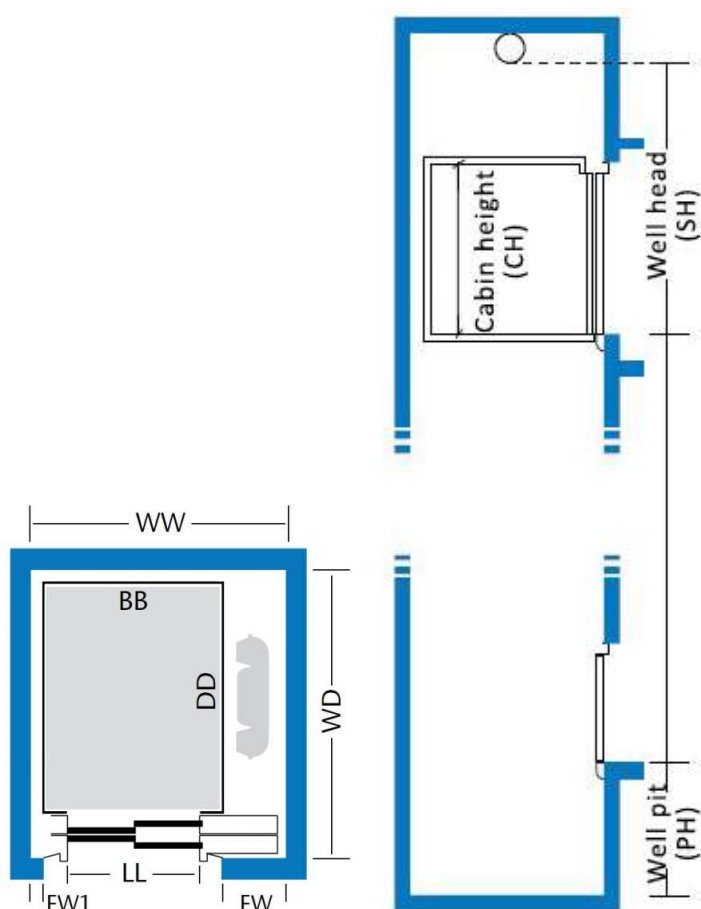


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Cabin Ventilator (OCV A)	timed shutdown of the ventilator in the cabin to allow energy savings; automatic restart in case of call
Ligh Curtain	infrared rays that cross the opening of the door to prevent closing in the presence of obstacles
Info Screen	Info screen to display building related information in the car(lift) and landing

### 13.2 HYDRAULIC LIFT (INTERIOR)







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Technical Specifications	
Load (kg)	630
Capacity (people)	8
Velocity (m/s)	1.6
Stops	3
BB (mm)	1100
DD (mm)	1400
Door Opening LR (mm)	950
Door Height CH (mm)	2100
WW min (mm)	1750
WD min (mm)	1810
FW (mm)	400
FW1 (mm)	400
Well head SH (mm)	Elevator Pit Head SH (mm)
	CH + 1850
Well pit PH (mm)	Elevator Well Pit PH (mm)
	1350

Recommended Options	
Fire alarm (FID)	upon operation via a belt from external detectors, the lift takes you to the main floor
Automatic Floor Return (EBD A)	in case of a power failure the cabin descends automatically to the nearest floor
Earthquake Contact (EAQ)	connected to a seismic detector that takes it to the nearest floor and makes it stand with the doors open
Malfunctioning signal (DAL GP)	Signalises in case of malfunctioning of the system
Cabin Light (OCL A)	timed shutdown of the light in the cabin to allow energy savings; automatic restart in case of call
Cabin Ventilator (OCV A)	timed shutdown of the ventilator in the cabin to allow energy savings; automatic restart in case of call



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Ligh Curtain	infrared rays that cross the opening of the door to prevent closing in the presence of obstacles
Info Screen	Info screen to display building related information in the car(lift) and landing

#### 14. EMERGENCY STAIRS

The emergency ladder will be built of a metallic structure, providing a connection from the ground floor to the second floor, which is planned to be realized in the exterior of the building.

#### 15. PWD ACCESSIBILITY

The museum will provide PWD accessibility at all levels. To realize the platform for the accessibility of the disabled level zero for traffic, to design the external elevator will be used for the movement on the other two floors and in case of evacuation. The building will have a minimum of 2 sanitary facilities.

##### 15.1 PWD ACCESSIBILITY PLATFORM

The platform is designed to transport a disabled person in a wheelchair between two floor levels. To provide lifting force, the elevator uses a hydraulic cylinder under the platform, by a pump unit mounted below the platform cover. When not in use, the platform can be folded in a vertical position. The control station is provided in the platform power pack. The front of the platform should be positioned parallel to the rise and not more than 10mm away from it. The erection should be a solid smooth surface without lumps.

##### 15.1.1 EXECUTION

The platform is set to move at heights between 80mm and 1000mm. Set the platform ready for use using the lever control to raise it to the desired level. The device has two parts: an inner shaft connected to a T element and an outer shaft.

The device is inserted in the appropriate space in the power supply mechanism. Rotate until a stop is felt. We place the device by inserting it with constant internal force. The T element rotates clockwise approximately half a turn until tight. Hold outer sleeve and turn T-bar CLOCKWISE until tight. Withdraw tool.

Platform's Technical Specification	
Load (kg)	250kg





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Maximal Movement	1000mm
Power	240V AC -50/60Hz
Control tension	24V DC (The platform control circuits are powered by a battery which must be kept constantly lit)
Hydraulic Pump Pressure	600W

## 16. METALLIC EXPANDED MESH

Expanded metal mesh which can be used for exterior facade is a form of metal sheet with various shaped openings in the area. It can be made of a range of materials, such as carbon steel, aluminum metal, stainless steel metal, nickel metal. But aluminum expanded metal mesh is the most common than others because of its lighter weight and better corrosion resistance. Besides, after being expanded by machine, the expanded metal mesh becomes stronger, lighter, and more rigid as well as having a skid resistant surface. With so many good features, it becomes a new type of building materials mainly used as elegant building exterior facade. It is specially designed to minimize installation time and installation cost. It can be widely used in various kinds of buildings, office building, shopping mall and so on. Its high visibility and guarding properties can let you benefit a lot.

By using the advanced production technology and equipment to ensure the quality of the metal mesh, we can offer you various kinds of expanded metal facade mesh in different sizes to meet your special requirement.

### Features:

- Anti-corrosive.
- Durable and economical.
- High visibility and guarding properties.
- Available in various colors.
- Low wind resistance.
- Good ventilation properties.
- Easy cutting and installing.
- Light weight.
- Minimize installation time and installation cost.

Metallic Mesh Specifications	
Material	Aluminum metal
Hole Shape	Diamond



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Surface Treatment	PVC coated
Thickness	0.5-8mm
Panel or roll width	1m
Panel or roll length	1828.8 mm
Note	Other width or length also can be made

### 16.1.1 EXECUTION

Expanded: The expanded process is using the automatic expanded machines to cut the metal sheet in the transverse direction and at the same time stretch in length without loss the material. And then pass through a cold rolled reducing mill. During the process the length of the sheet is prolonged about 5%, but the width of the sheet remains the same.

Surface processing: anodizing aluminum expanded metal mesh, powder coated aluminum expanded metal mesh, and PVC coated aluminum expanded metal mesh, etc.

## 17. LIGHTING

Nr.	PERSHKRIMI	SASIA	FOTO
	H: 5.5cm Cutting Hole Ø: 7.5cm Material Aluminium Depth Required : 10.5cm Special Feature GU10 Lampholder IncludedColor	132	
	Frame size: 106mm Cut hole size: 90mm Material: Aluminum Diecast Color:white Light source installation: back- mounted	132	



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	Llampe LED GU10 5W	132	
	Profile with opal diffuser NERI	45	
	Shirit LED profesional 24v 9.6w/m	90	