

**REPUBLIC OF ALBANIA**

**UNDP-ALBANIA**

*Number: 65526*

**TECHNICAL SPECIFICATIONS**

**FOR THE CONTRACT**

**PREPARATION OF DESIGN AND SUPERVISION FOR REPAIR AND  
RETROFITTING OF:**

**ISMET NANUSHI JOINT HIGH SCHOOL**



**LOT I**

**MUNICIPALITY OF DURRES**

**“ARKIMADE” shpk**

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## **SECTION 1 GENERAL SPECIFICATIONS**

### **1.1 General Specifications**

#### **1.1.1 Units of Measurements**

The units of measurements to be used in connection with this contract are metric units of cm, m, km, kg, and degrees Celsius (C°). Decimal points are written as “.”.

#### **1.1.2 Programmed for the Execution of the works**

The Contractor shall submit to the engineer a fully detailed programme showing the order, the procedure and method by which he proposes to carry out the construction and completion of the Works.

The information to be supplied to the engineer 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 labor strength, skilled and unskilled, and supervision arrangements.

The manner and the order in which it is proposed to execute the permanent works is subject to adjustment and approval by the Engineer, and the Contract price shall be held to include any necessary adjustment required by the Engineer during the course of the work.

#### **1.1.3 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 Engineer satisfaction.

#### **1.1.4 Advertising, Boarding, etc.**

No advertising material whatever will be permitted to be displayed on the site except that:

The contractor shall construct two boards, carrying information supplied by and erected in the locations specified by the Employer. The wording shall be presented in such a way as to be legible at a distance of 100 meters. The cost of these boards will be included in the Contractor's rate in Bill of Quantities.

### **1.2 Submissions to the Engineer**

#### **1.2.1 Written Authority**

“Order in writing” shall mean any document or letter signed by the Engineer and posted or delivered to the contractor and containing instructions, guidance or directions to the contractor for the execution of the Contract.

Whenever the word approved, directed, authorized, required, permitted, ordered, instructed, designated, considered, necessary, prescribed, or words (including nouns, verbs, adjectives and adverbs) of like important are used, it shall be understood that the written approval, direction, authority, requirement, permission, order, instruction, designation, prescription, etc. of the engineer is implied unless another meaning is plainly intended

### **1.2.2 Submissions to the Engineer**

The contractor should submit to the engineer every additional work; a detailed drawing and the work should begin only after Engineer approval.

The contractor should sign proposals, details, sketches, accounts, informations, materials, test certificate, whenever requires by Engineer. The engineer 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 agreeing with engineer and referring the approved program and necessary time that the engineer needs to submit those works.

#### **Samples**

The contractor should provide samples, labeled due to all fittings, accessories, and other issues might be asked from the engineer for inspection.

The samples should be submitted to the Engineer's office.

The drawings of implemented works and measurement hand-book

The contractor will prepare and submit to the Engineer three groups of work documentations due to the project. This material should contain a drawing set of the implemented project, the additional drawings made during work implementation approved by the engineer, and the measurement handbook per each work volume.

## **SECTION 2 SITE CLEARENCE AND DEMOLITION**

### **2.1. Clearance of site**

#### **2.1.1. Clearance of site**

At the commencement of the contracts, unless otherwise specified or directed, the Contractor shall remove all vegetation and all objectionable organic material from the construction area, and burn or dispose of all such debris in tips to be provided by the contractor.

#### **2.1.2 Scaffolding**

Large excavation including top soil removing, executed by hand or machine in terrain of whatever nature, compactness, or degree of saturation (shaley even if compact, sandy, gravely or rock terrain), including the cutting and removing of roots, stumps, rock and materials with a dimension not exceeding 0,30 m3, including allowance for the protection of underground structure such as drains, pipelines, etc, and including the location resulting material within the work site.



### 2.1.3 Removal of structures, fences etc.

The Contractor shall carefully take down and clear only such buildings, or other structures directed by the engineer. The components shall dismantled , cleaned and stacked in separate heaps. Materials, which in the opinion of the Engineer are not fit for re-use shall be removed from the site to a tip, provided by the contractor. Materials, which are re-usable, shall remain the property of the Employer and shall be preserved and protected by the Contractor until removed by the Employer or until the expiration of the Contract.

### 2.1.4 Building, fences and structures protection

During demolition work, the contractor should take adequate precautions in order to protect the buildings, fences, surrounding walls and structures near the object, where are executing these demolition works.

Over- loading of any part of the structure by debris and materials shall be avoided. When materials or debris are lowered, care shall be taken to prevent the material swinging, falling or being projected in such a manner that it creates a danger to the safety of personnel, the surrounding structure of public property of any kind.

When mechanical plant such as cranes, hydraulic and excavators and rock breakers are used for demolition, care shall be taken to ensure that no part of such machines can come into contact with or in close proximity to overhead or underground electricity or telephone wires or cables. The contractor shall in sufficient time prior to the commencement of the works, inform the relevant Authority so the Authority may take necessary steps for rerouting the cables.

### 2.1.5 Protection of cleared site

Suitable nets, protective hoarding and barriers shall be erected by the Contractor to prevent accidental harm to persons or damage to property by falling or flying materials and debris.

## 2.2 DEMOLITION WORKS

### 2.2.1 Scaffolding

Any scaffolding required shall be designed and erected in accordance with the relevant standards. An experienced and competent scaffolder shall carry out erection of scaffolding and it shall be of an independent tied type. The Contractor shall ensure that all necessary adjustment is required to the scaffolding to ensure its stability is made as the work proceeds. Care shall be taken that the load of any debris collecting on a scaffold does not exceed the loading for the design. All measures necessary shall be taken to prevent debris from being accidentally dislodged from the platform. Scaffolds shall at all times during use be suitable for the purpose for which they are intended and shall comply with any local Authority requirements.

Where necessary, the scaffolding will be protected on the perimeter to roadways and passageways should be taken precautions in order to make a surrounding of the object, and also the whole scaffolding protection fixed by protecting netting in order to eliminate material swinging and including required signal, illumination and the conditions of technical standards.



**Steel scaffolding of trestle type**, in accordance with local standards and regulation, including the supply of support, maintenance, assembly, anchorage, dismantling etc. To a maximum height of 12 m, of horizontal elements should have vertical balustrade, to a min. height 15 cm and also protecting netting.

**Steel scaffolding framed and braced**, in accordance with local standards and regulations, including transport supply, maintenance, assembly, anchorage, dismantling etc. To a maximum height of 12 m, of horizontal elements should have vertical balustrade, to a min. height 15 cm and also protecting netting.

#### 2.2.2 Supervision

The contractor shall appoint a competent and experienced person trained in the type of operation being used for demolition to supervise and control the work on site.

#### 2.2.3 Method of demolition

The contractors proposed method of demolition would be such that where part of the structure is to remain, the method adopted for removal must ensure that no damage or weakening of the remaining structure occurs. The contractor shall take adequate precautions to ensure the stability of that part which remains. The method employed shall be subjected to the Engineers approval.

Where demolition work cannot be done safely from a part of the structure, a suitable working platform must be used. The structure shall generally be demolished in reverse order to that of construction. Steel and reinforced concrete structural members shall be lowered to the ground or be cut into lengths appropriate to the weight and size of member before being allowed to fall. Debris shall be allowed to fall freely only where there is no danger of damages occurring to the retained structures.

When building demolition or its elements cannot be done without problems divided from structure part, it will be use an appropriate working method. Steel elements and concrete structures strengthened will be put on the ground or will be cut horizontally, due to wideness and measurements in order not to swing down. Wood elements can be swung from upstairs, only when they don't represent danger for the other part of the structure. When the elements are demolished, should be taken precautions in order not to risk the other constructive holding elements and to do not damage the other elements.

Generally, demolition work shall commence by removing as much dead load as possible without interfering with the main structural members. Temporary works shall be designed to carry the required loads under the most severe conditions. Sections to be demolished shall be supported by suitable lifting equipment then cut and lowered to the ground under control.

#### 2.2.4 Safety

The contractor shall ensure that the plant and equipment is:

- a) Of an appropriate type and standard having regard to the location and type of work involved

- b) In charge of a competent and experienced operator.

Maintained in good working condition at all times.

## **2.3 Demolition of Buildings Elements**

### **2.3.1 Dismantling of roofing and terraces**

The dismantling of terraces structural framing composed of trusses, beams or joists, flashing, roof gutters, gutters and relative fastening, chimneys, including scaffolding, the stacking of materials within the worksite, and the provision of all requirements not specified for the satisfactory completion of the work.

The demolition of ceiling linings of whatever type including supporting beams and joints, plaster and electrical work; including scaffolding the stacking of materials within the worksite and the provision of all requirements not specified for the satisfactory completion of the work

The removal of waterproofing membranes from terraces including up-turns, also where the up-turns are found against chimneys, composed of three layers of bituminous felt, including the removal of the capping or related metal fascias to adjacent parapets, and the stacking of the resulting material within the worksite.

The demolition of render at vertical surfaces to a height of at least 30 cm, for the installation of new waterproofs membranes, including all requirements to complete the work in a satisfactory manner.

### **2.3.2 Demolition of brick masonry**

The demolition by whatever means, total or in part of brickwork or pre- cast terracotta, included rendered work or tiled work, of any form, thickness height or depth of wall, including scaffolding, necessary reinforcing for the consolidation of the structure or surrounding buildings; the reparation of damages caused to third parties for breakage and normal repair in the course of work to service supplies both public and private (drainage, water, light, etc.), without allowing for salvage and cleaning of material re-use, but with the relocation of material within the worksite, and including the provision of all requirements not specified for the satisfactory completion of the work.

### **2.3.3 Removal of flooring**

The removal of flooring of whatever type, including the removal of bedding mortar and the location of resulting material within the worksite.

### **2.3.4 Removal of wall tiling**

Removal of wall tiles of whatever type, including the removal of bedding mortar, the cleaning, washing with water under pressure and the location of resulting material within the worksite, and including all requirements to prepare the surface for re-tiling.

#### 2.3.5 Removal of windows and doors

The removal of windows and doors of whatever type, including architrave's, beadings etc, with the storage of materials within the worksite including the eventual selection (to be decided by the Supervisor of Works) and stacking within the worksite in the specified location for re-use.

#### 2.3.6 Removal of metal grating

Removal of metal grating of whatever type and the relocation within the worksite, including eventual selection (to be decided by the Supervisor of Works) and stacking within the worksite in the specified location for re-use.

### **SEKSIONI 3 EARTHWORKS, EXCAVATIONS AND FOUNDATIONS**

#### **3.1 Earthworks**

##### 3.1.1 Formations prepare

Formations prepare includes these works:

- Introduction and precision of installed net underground as i.e.: water supply pipes, outlet pipes, electric and telephony cable etc.
- Terrene measurement and soil testing.
- Deforestation and roots removal from terrene.
- Soil removal by humus and its transport or re-using.
- Whole foundation digging up to the necessary deepness.

##### 3.1.2 Sloping elaboration.

In cases of sloping terrene are used three following methods:

- Slope leveling according the lowest terrene point.
- Terrene backfilling by surplus material, up to highest terrene point
- Digging and backfilling according the average point.

Each of these cases will be used depending on soil type, on support ability terrene and of building loading will be construct in that terrene.

##### 3.1.3 Soil works drenaging

Drainage can be a drainig net or only a drain. As drainig net materials might be used plastic pipes, concrete pipes or clay pipes. The pipes should be placed through open drains, leveled and presses as required. The pipes should be placed after drain opening and gravel backfilling of a layer at least 7 cm. After pipes placing should be thrown gravel or sand 4/32 of a layer 10 cm in order to protect the pipe. After that the drain will be backfilled by the soil left from digging.

The drainage by drains is realized by opening first the drains and then filled by gravel. The drains according the request should have one of this surfaces: 20x30, 30x40 ose 30x60 cm. The distance between drains should be determined according to ground filter coefficient.

#### 3.1.4 Soil work protection

The people that are not included in project construction should be well protected by soil works, and the staff working in project realization should be as well protected. Care should be taken from the foundation diggings.

Protection of the pedestrians can be realized throughout building an encirclement (fence, wire net etc), which does not allow them (especially children) to risk. Warning Signs boards should be hanged, in order to forbid the pedestrians pass inside the encirclement.

The wholes and the workers are working in it should be protected from downfall. Moat stair per each whole depends on soil quality by min. 45° up to max. 60°.

If the soil contains minerals, which by water contact loose the stability, then the soil and particularly moat should be well protected by rain, equipped by support reinforcement according KTZ.

#### 3.1.5 Soil works during frost periods

Soil works can be executed during winter period as well, where the temperatures are under 0° C.

### 3.2 Excavations for foundations and basis

#### 3.2.1 Excavations

Excavations for foundations or underneath works of 1,5 m thickness from earth basis, in whatever kind of ground and consistence, dried or moistened (of argil and if is compacted, sand, gravel, stones etc,) including cutting and extraction of the roots, stumps, stones, and parts of a volume till 0.30 m<sup>3</sup>, obligations accomplishments regarding underground constructions as waste drainages, drainages in general etc.

#### 3.2.2 Fillings

Stone layer and selected brick masonry peaces, in well-compacted layers, without dust, render and organic materials, that result by described demolitions in the above-mentioned articles. The Supervisor will first check all materials that result from demolitions, and he will authorize their utilization.

#### 3.2.3 Utilization of Excavated material

Suitable material and the material recovered from temporary work shall be utilized for backfill. Any surplus material shall be disposed of any shortfall made up with suitable fill.

#### 3.2.4 Backfilling around structures

The material shall be placed simultaneously on both sides of an abutment, wall or pier. The backfilling shall be carried out with an approved material in horizontal layers not exceeding 150mm in depth after compaction.

### 3.3 Standards foundations

#### 3.3.1 Concrete foundations

Foundations executed in concrete type – 100 in dosage per m<sup>3</sup> and poured in thick layers well vibrated, with dimensions and shape as indicated in the relevant drawings, including the scaffolding, formwork, propping and all requirements to complete the works in a first-class manner.

### 3.3.2 Foundations in stone masonry and concrete

Buildings foundations and basis of butoconcrete, limestones in the following proportions not exceeding 20 cm per m<sup>3</sup>: concrete M 100, 0.77 m<sup>3</sup> and stone with concrete in dosage of 0.37 m<sup>3</sup>, including formworks, propping and all requirements to complete the work in a first-class manner.

### 3.3.3 Column Foundations & Pile Caps

Pile caps realized and suitably reinforced due to the instructions of the project, in concrete M 200, realized in thin layers and well vibrated, in dosage of concrete M 20 **inert**, including reinforcement, formworks, proppings, and any other obligation and skill for work accomplishment.

## 3.4 Foundations ancillaries

### 3.4.1 Waterproofing of footings

The vertical waterproofing of footings in hot fixed bitumen, formed from a layer of bitumen emulsion and two layers of bitumen M3 with 3.8 kg per sqm, including all requirements to complete the work in a workmanlike manner.

### 3.4.2 Waterproofing of foundations

#### 3.4.2.1 Foundation waterproofing in buildings without basement

In buildings without basement waterproofing of the upper horizontal level in foundations will be in plinth altitude by mortar, concrete, sand 1:2. mortar will be added as needed to the cerezit. This waterproofing layer should be connected to floor waterproofing and to external vertical side of foundations, which is in the middle of plinth level.

#### 3.4.2.2 Foundation waterproofing in buildings with basement

Buildings with basements:

- a) Waterproofing of horizontal foundation in basement floor waterproofing altitude will be as paragraph 3.4.2.1.
- b) Waterproofing of external foundation masonry side. This is connected to horizontal level waterproofing and is no less than 10 cm over pavement altitude.

### 3.4.2.3 Waterproofing manner

Before waterproofing foundation works and other sub-terrenean structures, the place should be cleaned from scaffoldings, which creates obstacles in waterproofing layers.

During waterproofing of foundation horizontal sides to be followed these conditions:

- a) Leveling of foundation surface;
- b) Before putting polished cement layer, will be its moisturizing;
- c) Mortar should be prepared by 1 part cement and 2 part cleaned and rough sand (taken in volume) and polish to be built in thickness 20 – 30 mm and leveled. In places by dense humidity to be added to cement quantity, 8 up to 10 % waterproofing solution.

Vertical sides of basement masonry will be waterproofed by bitumen (primer), bitumen-waterproofing membrane etc. Due to project forecast, in accordance to the level of sub-terrenean waters and terrene conditions.

Waterproofing will be from downside to upside. Waterproofing layer by bitumen-waterproofing membrane or bitumen (primer), should be protected due to project notes usually by brick masonry of thickness 12 cm. Outside protection masonry will be placed clay in wideness 30 – 50 cm, well pressed. Waterproofing-bitumen membrane layers are placed horizontally, considering overlapping and non-accordance of layers.

### 3.4.3 Perimeter and superficial drainage

The perimeter drainage shall be realised along the foundations, but not on them. This drainage is composed of ring line with out let pipes and control traps.

If under the building floor there is a capillary layer, then it is needed ring drainage with tubes as in the figure No.1.

In cases when the drainage is realised under the foundation basis, the foundation basis should be deeper.

The pipes shall be laid from the lowest to the highest point, straight sloped, on a gravel filtering layer 15 cm thick and shall be covered about 25 cm with the same filtering material. Also, should be considered that the tube basis should be min. 20 cm under floor level, in order that water gets away easily from the capillary layer.

Pipe dimensions should be min. 50 mm; the gravel that shall be used for filtering layer should be of grains not smaller than 3.2 mm.

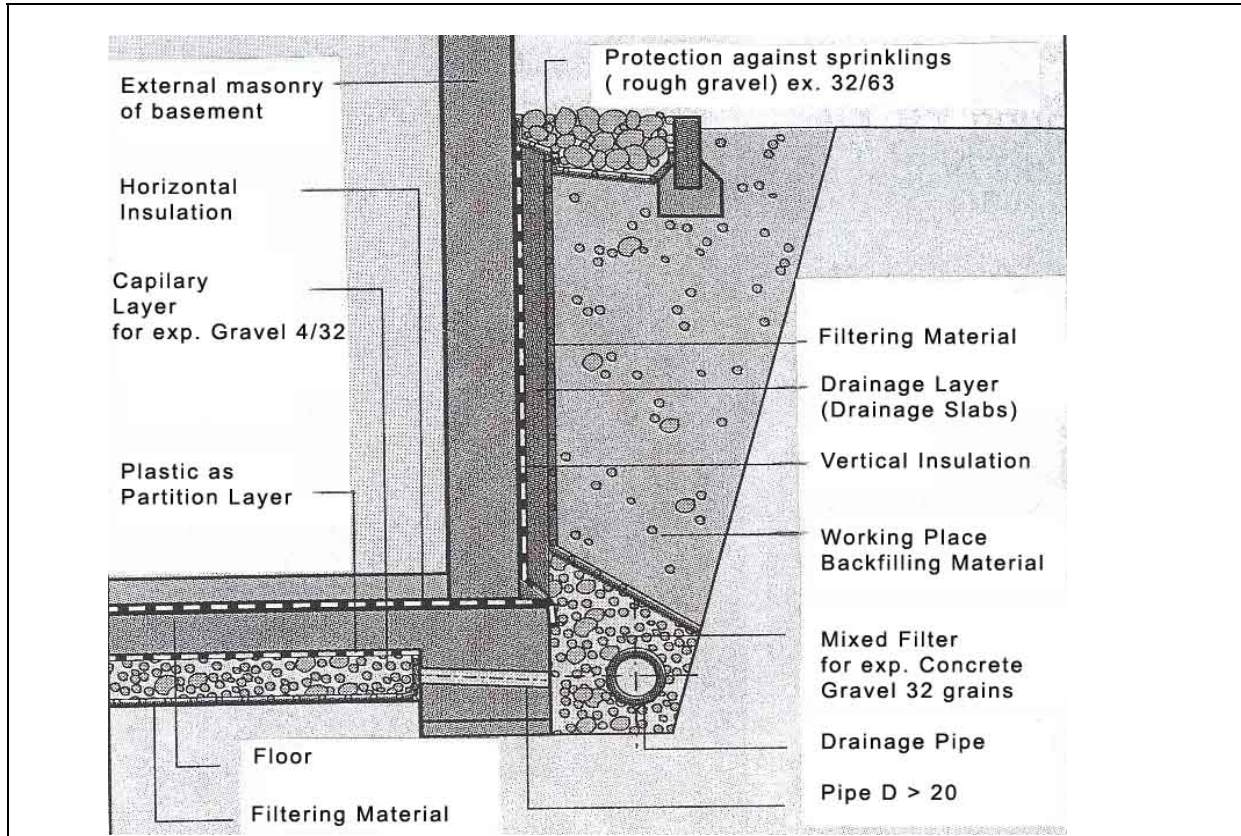
Except the perimeter drainage, big role in the foundation drying has played the superficial drainage, which shall be realised as following.

In the whole floor surface shall be realised a drainage layer and on it shall be laid a partition layer in order to avoid the floor concrete intrusion into the drainage layer. If for the drainage



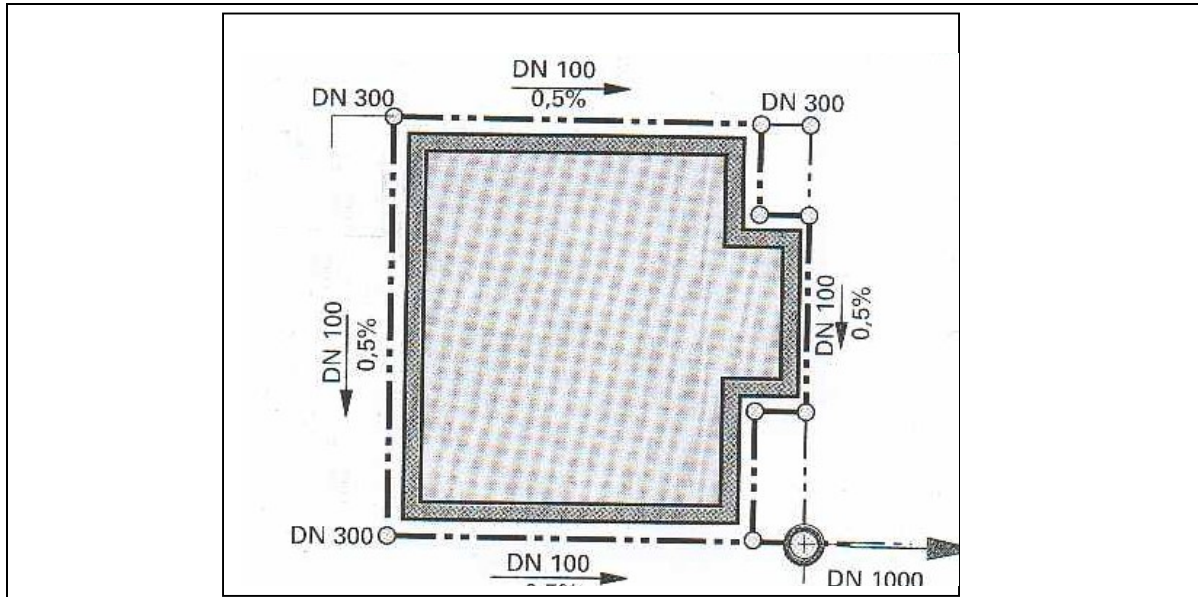
process shall be used gravel for concrete 3,2 mm then the drainage layer thickness should be min. 30 cm thick and if it will be used gravel 4 – 32 mm, the bedding shall be realised casting only 10 cm in the whole surface. Under the drainage bedding shall be laid drainage pipes. The diameter and distance between them is depending by the water quantity. The drainage pipes shall be encircled with gravel filtering layers and connected to the perimeter drainage pipes.

In the figure No. 2 is presented a laying manner of drainage pipes



Drawing No.1





Drawing No. 2

## SEKSIONI 4 CONCRETE, FORMWORKS AND REINFORCEMENT

### 4.1 In situ-concrete

#### 4.1.1 General requirements for concrete

Concrete aggregate shall consist of sharp sand or crusher dust, crusher gravel and other solutions for propping, water penetration and to enable the work in low temperatures according technical requirements of the project.

#### 4.1.2 Materials

- Concrete elements

Concrete elements shall consist of sharp sand or crusher dust, or mixture of these, and hard durable crushed locally occurring stone. All aggregates shall be free from clay and all other impurities. The coarse part of the aggregate shall be roughly cubical in shape and not spherical. The grading of the aggregate shall have the certificate of the place where they are taken from.

- Cement

The contractor shall supply with each consignment of cement a copy of the invoice stating the quantity delivered, the maker's name and also the maker's certificate showing that each consignment has been tested and analyzed and conforms to the Standard. The cement shall

be subject to such Standard test as the Engineer may deem necessary and he may reject any cement, which proves unsatisfactory notwithstanding the maker's certificate.

For more details regarding the cement type that shall be utilized for concrete production, see 4.1.4, because for different concrete types shall be utilized different cement types.

- Water for concrete

The water that shall be used for the concrete production should be free of substances that damage it, such as: acids, alkalis, clays, lubricants and other organic substances. In general, the water of population supplying system (potable water) is recommended for utilization in concrete production.

#### 4.1.3 Storage of Materials

The storage of materials that shall be used in concrete production should fulfill the following conditions:

- The cement and its ingredients should be stored in order to be divided from the other materials, which are not suitable for concrete production and damaged its quality.
- The cement should be stored in dried spaces which keep it away from water rain moistening.

#### 4.1.4 Classification of concrete

4.1.4.1 Concrete type 100, with aggregates all-in: 240-kg cement (concrete type 300); 1,05 m<sup>3</sup> gravel; 0,19-m<sup>3</sup> water.

4.1.4.2 Concrete type 100 slump 3 – 5 cm. aggregates max. size 20 mm, clean sharp sand (2,6 mod.): 240 kg cement (concrete type 300); 0,45 m<sup>3</sup> sand; 0,70 m<sup>3</sup> aggregate; 0,19 m<sup>3</sup> water.

4.1.4.3 Concrete type 150 slumps 3 – 5 cm. aggregates max. size 20 mm, clean sharp sand (2,6 mod.): 260 kg cement (concrete type 400), 0,44 m<sup>3</sup> sand, 0,70 m<sup>3</sup> aggregate, 0,18 m<sup>3</sup> water.

4.1.4.4 Concrete type 200 slump 3 – 5 cm. aggregates max. size 20 mm, clean sharp sand (2,6 mod.): 300 kg cement (concrete type 400), 0,43 m<sup>3</sup> sand, 0,69 m<sup>3</sup> aggregate, 0,18 m<sup>3</sup> water.

4.1.4.5 Concrete type 250 slump 3 – 5 cm. aggregates max. size 20 mm, clean sharp sand (2,6 mod.): 370 kg cement (concrete type 400), 0,43 m<sup>3</sup> sand, 0,69 m<sup>3</sup> aggregate, 0,18 m<sup>3</sup> water.

4.1.4.6 Concrete type 300 slump 3 – 5 cm. aggregates max. size 20 mm, clean sharp sand (2,6 mod.): 465 kg cement (concrete type 400), 0,38 m<sup>3</sup> sand, 0,64 m<sup>3</sup> aggregate, 0,195 m<sup>3</sup> water.

#### 4.1.5 Concrete production

The concrete of the defined type should be prepared by the designer and according to the mixture recapture of materials in support of the rules given in KTZ 37 – 75 “Concrete design”.

During the concrete preparation should be followed the rules given in chapter 6 “Concrete preparation” of KTZ 10/1-78, paragraphs 6.2, 6.3 and 6.4.

#### 4.1.6 Placing of concrete

Placing of concrete produced in work shall be realised according to possibilities and conditions when it shall be placed. Generally, to this aim shall be used fixed cranes placed in the object and truck mounted concrete pump.

Very important during the concrete layer is the duration from producing to laying, which shall be as short as possible.

Also, during the concrete laying is very important a best possibly vibration, during this process.

#### 4.1.7 Construction joints

Construction joints shall be used without interruptions, if it is possible. In cases when this is not necessary or obligatory, then shall be taken all precautions to realise the joining of both construction joints in different periods.

The interruption of construction joints works is to determined due to the possibilities, realising:

- Iron sheet in a width of 10 cm and thickness of 4 mm, from which 5-cm in the fresh concrete and concreted, while other 5-cm serve for the next concrete casting.
- Eaves line, which should be laid according to producer specifications.

#### 4.1.8 Protection

Fresh concrete should be protected against these influences:

- Rainfall and humidity, covering the concreted surface with plastics and other waterproof materials.
- Frost (during the producing process, augmenting solutions against low temperatures, which enable the concrete casting till zero temperature.
- High temperatures. The concrete shall be protected against high temperatures, sprinkling it with water, in order to avoid possibly cracklings.

#### 4.1.9 Adverse weather conditions

The concrete producing and placing is not recommended in adverse weather conditions.

The concrete producing and placing is prohibited in cases of torrential rainfall, because the big volume of water in the concrete layer removes the cement and so the concrete loses the requested concrete type.

In cases of low temperatures - 4° C, it is recommended to avoid the concrete casting, but if this is necessary, then shall be taken the precautions that during the process of concrete producing shall be also augmented the solution against frost in appropriate quantity, recommended by the producer of this solution.

Concrete production and elaboration in high temperatures can influence negatively the chemical reaction of the cement to other concrete elements. For that reason, it shall be protected against high temperatures. Protection way against high temperature can be done in such a way that fresh concrete be protected against sunshine, covering it with plastics, sawdust, sprinkling with water. Another contribution for concrete elaboration in high temperatures is coloration in white of the water reservoir and continuously sprinkling with water.

#### Pipes and Conduits

Pipes and various drainage that make possible building supply (water, wastewater, electricity, etc.) if possible shall not be concreted, to enable the homogeneity of the concrete parts, which are designed as scaffolding, concrete elements. In cases when, this condition cannot be fulfilled, then shall be consulted the constructive engineer.

In cases when it is needed to pass through masonry or other concrete slabs, then during the designing phase, it is necessary the considering of these exits and planning/accounting by the constructive engineer and their insulation. Also during the concrete placing it is needed the preparation of these exits, throughout will pass through the pipes and other supplying drainage.

#### 4.1.10 Testing of concrete

When the concrete is produced, it shall be tested if it fulfils the criteria according to the project requirements.

After producing and placing, it shall be taken a concrete sample to make the labour testing and the results shall be delivered to the Supervisor.

### 4.2 Concrete elements and sub-elements

#### 4.2.4 In – situ Lintels

Lintels for the width of the wall allowing for a seating of 25 cm both sides, of thickness according to the width of opening, appropriately reinforced, within a height of 4 m, cast in concrete type 200 with dosage per m<sup>3</sup>, including scaffolding, formwork, propping, steel reinforcing and all requirements to complete the work in a first class manner.

#### 4.2.5 Pre –cast Lintels

Supply and placing of pre-cast lintel s, within a width of 40 cm and variable sessions, with concrete type 200, regularly reinforced and according the instructions in the project, mixed with

cement mortar 1:2, including steel reinforcement, reinforcement works and all requirements to complete the work in a workmanlike manner.

#### 4.2.6 In –situ Beams r

Concrete beams appropriately reinforced, within a length of 4 m, formed from concrete type 200 with dosage per m<sup>3</sup>, including scaffolding, formwork, propping, steel reinforcement and all requirement to complete the work in a first class manner.

#### 4.2.7 Columns

Concrete columns, suitably reinforced and according to the indications of the drawings, within a height of 4 m, formed from concrete (type 200) poured in thin layers well vibrated, with dosage per m<sup>3</sup> as indicated in 4.2.4, including scaffolding, formwork, propping, steel reinforcing and all requirement to complete the work in a first-class manner.

#### 4.2.8 Type “SAP” Slab

Supply and installation of type “SAP” slab, installed on masonry walls previously prepared with levelling in cement (type 1: 2), with dosage per m<sup>3</sup>, anchor-fixed to the ring beam, appropriately reinforced, in concrete (type 200) poured in place, laid in the layers well vibrated, with dosage per m<sup>3</sup> as indicated in 4.a.4, which, according to the required span, will be reinforced with steel and supplementary slab, including scaffolding, formwork, propping, steel reinforcing and all requirement to complete the work in a first-class manner.

#### 4.2.9 Repairing of existing stairs

Stairs system with removal of all the missing or damaged parts, cleaning, washing it with water under pressure; realised with concrete with dosage according to 4.1.4.4 and similar to the existing part in good condition, including formwork, propping and all the requirements to complete the work.

#### 4.2.10 Fascia in the main entrance

The fascia in building entrance realised in reinforced concrete slab, which is as one with reinforced concrete part of building corpus and can be concreted in consul beam form or supported on a consul beam. Concrete type 200 till 250. The works can be realised including formwork, propping, scaffolding, and excavations for basements, reinforcement steel, and all the other requirements to complete the work.

#### 4.2.11 Reinforced concrete structure

Building part in reinforced concrete structure, constructed separately from masonry, foreseeing a technical eaves in a height of over 40 m. Reinforced concrete structure shall be formed of beams, columns, foundation pillars, stairs connected to one other skeleton; and realised: monolithic, in concrete type 200 to 250. These structures shall be realised commencing from the basements.

### 4.3 Formwork and concrete finish

#### 4.3.1 Preparation of formwork

Formworks shall be prepared of wood or steel and are ready or shall be prepared in the object.

Surfaces of formwork that are to be in contact with fresh (wet) concrete shall be so treated as to ensure easy release and non-adhesion of concrete to formwork during stripping.

Before reuse, all formwork shall be reconditioned and all form surfaces that are to be in contact with the concrete shall be thoroughly cleaned without causing damage to the surface of the formwork.

#### 4.3.2 Removal of formwork

Formwork shall not be removed before the concrete has attained sufficient strength to support its own mass and any loads that may be imposed on it.

This condition shall be assumed to require formwork to remain in place, after placing of the concrete, or the appropriate minimum period of time given in Table 4.4.1, unless the contractor can prove to the satisfaction of the Engineer that shorter periods are sufficient to fulfil this condition.

Minimum period before striking formwork using ordinary Portland cement.

Type of formwork	Minimum period before striking	
	16°C	7°C
Surface temperature of concrete		
Vertical formwork to column,	3 days	5 days
Walls and large beams	2 days	3 days
(Lateral formwork)		
Soft formwork to slabs	4 days	7 days
Props to slabs	11 days	14 days
Soft formwork to beams	8 days	14 days
Props to beams	15 days	21 days

Note:

The Engineer may allow a shorter period, when using Rapid Hardening Cement.

For cold weather periods should be increased by ½ day for each day the temperature falls between 7°C and 2°C, and one day for each day on which the temperature drops below 2°C.

Formwork shall be removed carefully so that chock and damage to the concrete are avoided.

#### 4.3.3 Surface classification of concrete elements

Classes of finishes are divided in two groups:

- Leaving the concrete surface after formwork removal in the same statement as after the concrete casting process.
- Concrete surface elaboration with plastering or coating.

Regarding the first group it might be considered that during the formwork placing, they should be polished and levelled and oiled with special oil for the formwork, in order that after the formwork removal, the concrete surface is polished. Also, during the concrete laying it should be uniform vibrated. Regarding the second group, the process is similar with masonry surfaces.

### 4.4 Reinforcement

#### 4.4.1 Materials

Steel works for all reinforced concrete structures and metal components, that are to be produced in site, by considering steel that complies all the requirements and without rust presence, in sizes and shapes according to the indications of drawings and technical legal standards for bending, joints and taking into consideration the providing with certificates from labs to verify that the steel fulfils the verified conditions to be used for the concerned work and including all other requirements not specified.

#### 4.4.2 Storage

Steel storage in site shall be made in such a way, in order to avoid its damage (shall be distorted, because this would extend the duration of the pre-stressed reinforcement) impediment of the works or of other construction materials.

#### 4.4.3 Bending of reinforcement

- a) Reinforcement shall be bent to the dimensions shown on the bending schedules.
- b) Except as allowed for below, all bars shall be bent cold and bending shall be done slowly, a steady, even pressure being used. Hot bending is not allowed.
- c) No flame cutting of high tensile bars shall be permitted except with the approval of the Engineer. Bars already bent may not be straightened and re-used.

#### 4.4.4 Placing and fixing



Reinforcement shall be positioned as shown on the Drawings and maintained in this position throughout concrete casting operations. It shall be secured by tying at intersections with 1,25 mm or greater diameter annealed wire or by the use of clips.

#### 4.4.5 Cover

The term cover in this context shall mean the minimum clear thickness of concrete between the surface of the reinforcement and the face of the concrete.

The minimum cover shall be according to the KTZ norms.

#### 4.4.6 Splicing

Splicing or joining of reinforcing bars shall be made only as and where shown on the Drawings or as shown drawings approved by the Investor.

The length of the overlap in a splice shall not be less than that shown on the working Drawings.

#### 4.4.7 Steel bearing and pre-tensioning

A piece of iron (with diameter smaller than 8 mm) shall be transported in round shape. For this, he should be beard in the construction site. Its bearing can be made through practical methods as for example: the fixing of one side in a certain point and extraction of the other side through different mechanisms. Also in polygons shall be realised the pre-tensioning of different elements, due to project requirements. This working process shall be executed very carefully and under observation of the head of workings.

## **SECTION 5 CONSTRUCTION STRUCTURE**

### **5.1 MASONRY AND WALL PARTITIONS**

5.1.1 Mortar for masonry in dosage per 1 m<sup>3</sup> shall be realised of:

5.1.1.1 Lime mortar type 15 with river sand (which porosity of 40% and water content with relevant increasing of volume by 20%) mixed in proportion of cement: lime: sand = 1: 0, 8: 8. 110 lt hydrated lime, 150 kg cement (type 300), 1,29 m<sup>3</sup> sand.

5.1.1.2 Lime mortar type 25 with river sand (which porosity of 40% and water connect with relevant increasing of volume by 20%) mixed in proportion of cement: lime: sand = 1: 0,5: 5,5. 92 lt hydrated lime, 212 kg cement (type 300), 1,22 m<sup>3</sup> sand.

5.1.1.3 Lime mortar type 15 with clean sharp sand (to have a porosity of 35%) mixed in proportion of cement: lime: sand = 1: 0,8: 8. 105 lt hydrated lime, 144 kg cement (type 300), 1,03 m<sup>3</sup> sand.

5.1.1.4 Lime mortar type 25 with river sand (to have a porosity of 35%) mixed in proportion of cement: lime: sand = 1: 0,5:5,5. 87 lt hydrated lime, 206 kg cement (type 300), 1,01 m<sup>3</sup> sand.

5.1.1.5 Lime mortar type 1:2 with clean sharp sand (to have a porosity of 35%) mixed in proportion of cement: sand = 1:2. 527 kg cement (type 400), 0,89 m<sup>3</sup> sand.

#### 5.1.2 Clay brick specifications

The brick as construction element shall fulfil the following conditions for anti-seismic constructions:

- Resistance during pressing, which shall be for bricks 75 kg/cm<sup>2</sup>; for hollow bricks 80 kg/cm<sup>2</sup>; for red bricks for ceiling 150 kg/cm<sup>2</sup>
- Resistance during cutting, which shall be: for all hollows brick 20 kg/cm<sup>2</sup>.
- Inter spaces percentage, which shall be: for brick 0-25 %; and for all the hollow bricks 25-45 %
- The thickness of perimeter and internal parapet for bricks shall not be lower than 20 mm and for all the hollow bricks; the thickness of perimeter parapet shall not be lower than 15 mm and of the internal meat, not lower than 9 mm.
- The surface of a hole shall be max. 4.5 cm<sup>2</sup>.
- Hygrophilicity in percentage shall be from 15 – 20 %.

#### 5.1.3 External brick masonry (type 25 cm)

Brick masonry of uniform or variable thickness to a height of 3m for external work, in full brick and lime mortar (type 25) with the following dosage per m<sup>3</sup>: n. 400 bricks, 0.25 m<sup>3</sup> lime mortar, 38 kg cement (type 400), to any thickness including material for toothing, vertical openings, edges, off-sets, scaffolding and all requirements to complete the work in a workmanlike manner. On ground floor bedding shall be laid on a layer of cement mortar (type 1:2), 2 cm thick minimum.

#### 5.1.4 External hollow brick masonry

Hollow brick masonry of constant or variable thickness to a height of 3m. for external work, in pre-cast terracotta and lime mortar (type 25) with the following dosage per m<sup>3</sup> : n. pre-cast terracotta bricks, 0,29 m<sup>3</sup> lime mortar, 44 kg cement (type 400), to any thickness, including material for toothing, vertical openings, edges, off-sets, scaffolding and all requirements to complete the work in a workmanlike manner. On ground floor bedding shall be laid on a layer of cement mortar (type 1:2), 2 cm thick minimum.

#### 5.1.5 Brick masonry (12 cm)

Masonry in brick with a thickness of 12 cm and lime mortar (type 25) according to 5.1.1 with the following dosage per m<sup>3</sup> n. 424 bricks, 0.19 m<sup>3</sup> lime mortar, 29 kg cement (type 400) and water.

#### 5.1.6 Internal brick masonry

Brick masonry with a thickness of 25 cm and lime mortar (type 25) with the following mortar dosage per m<sup>3</sup>: n. 400 bricks, 0.25 m<sup>3</sup> lime mortar, 29 kg cement (type 400) and water, to any thickness including material for toothing, vertical openings, edges, off-sets, scaffolding and all requirements to complete the work in a workmanlike manner. On ground floor bedding, shall be levelled a cement mortar layer 1:2, 2 cm thick minimum.

#### 5.1.7 Internal hollow brick masonry (11 cm)

Hollow brick masonry in (6 divisions) with a thickness of 11 cm and lime mortar (type 25) with the following dosage per m<sup>3</sup>: n.177 hollow bricks, 0,10 m<sup>3</sup> lime mortar, 14 kg cement (type 400) and water, including any requirement of materials for toothing, edges, vertical openings, off-sets, scaffolding and all requirements to complete the work in a workmanlike manner. On ground floor bedding, shall be levelled a cement mortar layer 1:2, 2 cm thick minimum.

#### 5.1.8 Internal hollow brick masonry (20 cm)

5.1.9 Masonry in hollow brick (6 divisions) with a thickness of 20 cm and lime mortar (type 25) with the following dosage per m<sup>3</sup>: n.172 hollow bricks cope, 0,12 m<sup>3</sup> lime mortar, cement type 400 and water, including all details and requirements for toothing, vertical openings, edges, off-sets, scaffoldings and anything else necessary to complete the masonry. On ground floor bedding shall be levelled a cement mortar layer 1:2, 2 cm thick minimum.

#### 5.1.10 Double brick masonry

As shown in the above-presented cases, but here we have two brick masonry lines placed very closely to one other and connected in a workmanlike manner.

#### 5.1.11 Double brick masonry

As shown in the above-presented cases, but here we have two hollow brick masonry lines placed very closely to one other and connected in a workmanlike manner.

#### 5.1.12 Rings beam masonry

General:

##### 1. Materials and production of rings beam:

Cement, water, sand and aggregates for concrete production, note point 4.1

Hollow brick rings beams are pre-prepared or can be prepared in the site. Rings beam made by approved labs shall be supported with certificate, which shall be presented to the Supervisor.

Rings beam placing shall be made in formwork as the requested measures well poured and pressed with the help of the vibrator.

2. Composition and mixture:

Concrete beam usually composed of Portland and other fine and rough approved aggregates, with grain max. 10 mm; beams mixture that shall be used on masonry construction should be 1: 2: 4, cement quantity shall not be less than 225 kg per m<sup>3</sup> of the concrete.

3. Beams resistance should be for interspaced beams 7 N/ mm<sup>2</sup>; for solid beams 10 N/ mm<sup>2</sup>; for hollow beams 5 N/ mm<sup>2</sup>.
4. After the rings beams are installed, they should be moistened with water for a 10 days period and it shall be used only after 30 days from manufacturing date.
5. The lime mortar for rings beam masonry should be composed of 1: 4 (1 part of common cement Portland and 4 pieces sand, which shall be previously cleaned. If the lime mortar is not mixed with mechanical mixers, shall be completely mixed 2 times dried and 2 times after water augmentation in a clean, waterproof platform. The lime mortar, which begins to freeze or has been mixed more than 30 minutes before, shall not be used or re-mixed.

6. Placing of ring beams

- a) All the ring beams dimensions should be as in the Drawings indicated dimensions
- b) The walls should be built suitably, no one side should be 1 meter lower than the other side, only with Supervisor approval. The works realised in differently levels shall not be accepted. In cases of cavity walls, both thicknesses should be max. approximately 400 mm.
- c) Ring beams rows should be suitably levelled. The vertical eaves should be clearly realised, as well as door-, window- and edge angels should be suitably locked.
- d) All the walls should be placed in conformity with the technical conditions KTZ.
- e) All ring beams should be moistened before being used in the masonry. The upper row of the ring beams placed in the masonry should be moistened, before the installing of the new masonry on it. Wall sides should be cleaned and without mortar sprinkles on it.
- f) All the ring beams should be previously with lime mortar well laid before the other row laying and all the eaves should be closed and constant in the whole masonry thickness of a row.

- g) In the previously plastered walls, horizontal eaves should not be filled in a depth of 15 mm.
- h) The ring beam should be connected to the reinforced concrete column every 2 rows through galvanised iron rails: 3 mm thick; 10 cm should be inserted in the column and 15 cm should be extended along the row.

Rings beams masonry with dimensions 0.4 x 0.25 x 0.19 m and lime mortar m-25 according to point 5.1.1 with dosage per m<sup>3</sup>: rings beams 52 peace, 0,103 m<sup>3</sup> mortar, 400 cement and water, including all requirements for toothing, edges, vertical openings, scaffolding and anything else necessary to complete the bedding in a workmanlike manner. Regarding the first row of the ground masonry, the socket surface should be levelled with a cement mortar layer 1:2 in a thickness of min. 2 cm.

## **5.2 ROOFING**

### **5.2.1 Terraces**

#### **Thermo insulation**

Thermal insulation is realized using thermal insulation material polystyrene with a thickness of 10cm placed in a sloping shape in the areas of waterproofing layers.

Covering with mortar layers of the required slope with a minimum thickness of 4 cm, realized with cement mortar (type 1: 2), leveled for the installation of the insulating layer.

#### **Hydro insulation**

Waterproofing should be spread on a dry, pre-leveled surface, including vertical surfaces. The waterproofing layer consists of 2 tarpaulin cartons with a thickness of 4mm, where the cement layer with a minimum thickness of 4cm will be placed.

The protection of the waterproof membrane with vertical or sloping plan will be realized with a layer of cement mortar with a thickness of 4 cm (mortar type 1: 2), the layer of mortar will be realized in a square shape 2 x 2 m, with joints of 2 cm, which will be filled with bitumen according to the requirements given in the drawings.

The installation of the parapets will be with a brick wall where on which a concrete strip / weapon with a minimum thickness of 10cm will be placed and the sheet metal hood will be covered with baked paint with drops and a slope towards the terrace.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### 5.2.2 Vertical gutters

#### Vertical Gutters

They serve for the unloading of roof and terrace waters, and in cases of bad functioning they should be dismantled and replaced with new ones.

Vertical gutters for unloading of roof and terrace waters shaped in galvanized steel by a minimum thickness of 0.6 mm and diameter of 12 cm, meanwhile vertical gutters of PVC with dimensions from 8 till 12 cm will serve a roof area from 30 up to 60 m<sup>2</sup>.

**Each gutter will collect the waters of roof or terrace in no greater than 60 m<sup>2</sup>.**

The gutters will be positioned at the external face of the building using galvanized steel pipe, covered by hot-fixed bituminous membrane 3 mm thick, placed within the sections of the wall parapet, giving a slope of 1%, towards a galvanized rain-head, in accordance to indications in the drawings.

The lower part of the gutter to a height of 2 m will be realized by PVC heavy pipes with his final part by bending at 90°, well fixed to the wall by appropriate accessories in galvanized steel.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### 5.2.3 Roof openings

Roof openings should be planned in these cases:

- Opening for chimneys cleaning
- Opening for snow removal in cases when it is heavy and risks roof balance.
- Openings for any roof adjustments.

For terrace objects should be foreseen / planned a safe opening inside roof. This opening should be done in the upper floor of the construction

For roof objects should be foreseen / planned a safe opening under roof. This opening should be realized throughout a window with dimensions 60 cm x 80 cm, which should be well tied to roof cover, in order not to have water flowing.

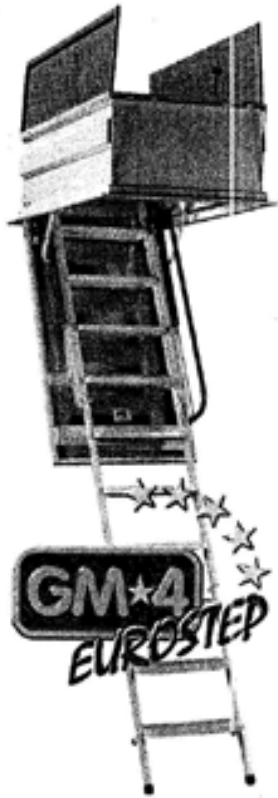
The terrace opening or under roof opening should have these dimension: max. 80 x 120 cm.

It is of a great importance that roof cover, fulfills the requirements of inflammability and heating coefficient, which should be similar to: roof/ ceiling heating coefficient.

Opening systems by cover and stairs, which in cases of non-utilization can be closed in order to do not create obstacles, should be designed due to their presence in market. In special cases they, should be elaborated by a specialist, due to architect / Supervisor requirements

A special attention should be taken for the joint of opening system on the roof with roof/ceiling.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**



**Important note: All the terrace materials components mentioned in this section such as polystyrene, bitumen paper, metal gutter and metal sheet cover, etc. must be delivered on the construction site only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## **SEKSIONI 6 FINISHES**

### **6.1 Wall finishes**

6.1.1 Facade coating with polystyrene  $t = 4\text{cm} / 5\text{cm} / 8\text{cm}$  + nets + plaster.

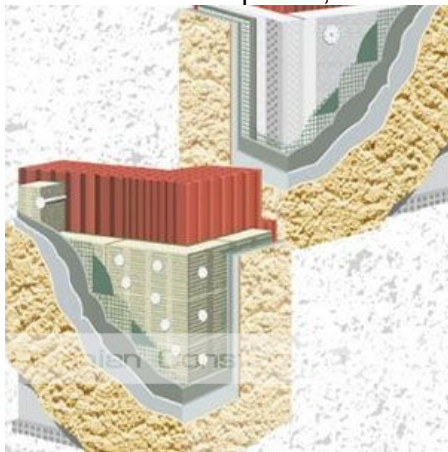
For the facade will be used facade cladding with compact green polystyrene with a thickness of  $t = 5\text{cm}$ ,  $t=4\text{cm}$  ,  $t=8\text{cm}$ . Attached is the mesh and then the plaster. The thermal facade consists of the following layers:

- Polystyrene
- Adhesive layer
- Upas for the wall
- Plastic nets
- Plaster



The thermal insulation panel has a polystyrene composition, provided in the project with a thickness of 4cm, 5cm and 8cm and a density of 30kg / m<sup>3</sup>.

Positioning according to the respective thickness is reflected in the project. Adhesive / glue is used for gluing thermal insulation panels. The adhesive mixture must always be prepared following exactly the specifications indicated by the manufacturer in terms of dosage and composition. Fixing of polystyrene with the support is done by means of plastic upholstery. The size of the ups should be 5 cm more than the thickness of the thermal insulation panel. The placement of the upas is predicted to be 9 pieces / m<sup>2</sup>. One up is placed in the center of each thermal insulation panel and the others are placed at the meeting points of the horizontal and vertical contours of the thermal insulation panels. After fixing the thermal insulation panels, the leveling layer is applied, which is composed of two basic elements:



-Leveling adhesive (plaster) is the product that should protect the insulating panel from atmospheric actions.

- The plastic mesh avoids cracks (shrinkage, swelling) of the plaster during drying as well as the movements transmitted from the insulator to the plaster, formed by oscillations of temperature and humidity.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

6.1.2 Facade cladding with solid compact polystyrene XPS t = 5cm for load bearing on the surface + glass mesh + glue for leveling + glue for fixing the tile, in wall facade ~ 8m

For the parts of the facade that will be covered with decorative tiles porcelain gres, will be used strong compact polystyrene and special glue Webercol evoflex C2TES1 or equivalent. The thermal facade consists of the following layers in order:

Cement adhesive for flattening WEBERTHERM Special CS2 or equivalent

Polystyrene XPS t = 5cm

Cement adhesive for flattening WEBERTHERM Special CS2 or equivalent

Plastic screws for fixing

Glass wire mesh 145gr / m<sup>2</sup>

Plastic profile + glued nets for doors and windows

Primer WEBER primacryl G with quartz for facade or equivalent

WEBERCOL evoflex C2TES1 glue for mounting tiles or equivalent

Angular and gutters

The thermal insulation panel has a polystyrene composition, provided in the project with a thickness of 5 cm and a density of 32 kg / m<sup>3</sup>.

Adhesive / glue is used for gluing thermal insulation panels. The adhesive mixture must always be prepared following exactly the specifications indicated by the manufacturer in terms of dosage and composition. Fixing of polystyrene with the support is done by means of plastic upholstery. The size of the plastic screws should be 5 cm more than the thickness of the thermal insulation panel. The placement of the plastic screws is predicted to be 9 pieces / m<sup>2</sup>. One up is placed in the center of each thermal insulation panel and the others are placed at the meeting points of the horizontal and vertical contours of the thermal insulation panels. After fixing the thermal insulation panels, the leveling layer is applied, which is composed of two basic elements:

- WEBERTHERM Special CS2 leveling adhesive or equivalent is the product that should protect the insulation panel from atmospheric action. This cement adhesive is also used for fixing wall panels.
- The glass wire mesh 145gr / m<sup>2</sup> avoids cracking (shrinkage, swelling) of the plaster during drying as well as the movements transmitted from the insulator to the plaster, formed by oscillations of temperature and humidity.
- Plastic profile + glued nets for doors and windows
- WEBER primer primacryl G with quartz for facade or equivalent
- WEBERCOL evoflex C2TES1 glue for mounting tiles or equivalent

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.3 Stucco graffiato

Stucco graffiato is used as a facade finish. Provides good adhesion and water resistance, high elasticity and allows the transpiration of structural elements. It is resistant to algae and bacteria and has a very low coefficient of water absorption. Color stability in the drying process and unlimited possibilities for color and texture. It is easy to work with, and is resistant to mechanical shocks.



Consume: 2,0mm  $\approx$  3,0kg/m<sup>2</sup>

Granulometry 4 mm

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.4 Internal plastering in new constructions

Preparations of walls and ceilings with a first rough-cast of render, using a fluid cement mortar for improving the adherence of the render and to reinforce the surface, including scaffolding and all requirements not specified for the satisfactory completion of the work.

Plastering composed of one layer of lime mortar (type 25) 2 cm thick with the following dosage per sqm: 0,005 m<sup>3</sup> clean sharp sand; 0.03 m<sup>3</sup> lime mortar, (type 1:2), 6.6 kg cement (type 400), water, with the appropriate profiles and guides (mortar beam of 15 cm thickness every 1 till 1,5 m) applied to walls and ceilings and trowel finished to a smooth surface, including scaffolding, and all requirements to complete the work in a first class-manner.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.5 External plastering in new construction

Preparation of walls and ceilings with a first rough- cast of render, using a fluid cement mortar for improving the adherence of the render and to reinforce the surface, including scaffolding and all requirements not specified for the satisfactory completion of the work.

Plastering composed of one layer of lime mortar (type 25) 2 cm thick with the following dosage per sqm: 0,005 m<sup>3</sup> clean sharp sand; 0.03 m<sup>3</sup> lime mortar, 7.7 kg cement (type 400), water, with the appropriate profiles and guides (mortar beam of 15 cm thickness every 1 till 1,5 m) applied to walls and ceilings and trowel finished to a smooth surface, including scaffolding, and all requirements to complete the work in a first class-manner.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.6 Waterproofing with 2 components

The waterproofing process is one of the most important processes in construction works as it realizes the protection of the environment from moisture. Waterproofing is performed on flat horizontal and vertical surfaces where a considerable amount of water is present.

Waterproofing in toilets and environments with the presence of water

ITC HD2 bicomponent waterproofing material will be used for waterproofing in toilets.

ITC HD2 is a two-component waterproofing material, with high flexibility and cement base, formulated to create a protective, waterproofing and leveling layer.

The material is packed in 25 kg bags and cans for component B with a protective layer from moisture.

- Surface preparation before applying the bicomponent.

The following measures must be taken before applying the bicomponent material: The surface of mortars and concrete should be clean of inert residues.

Pores in mortar and "channels" in concrete should be cleaned with water and then blocked.

The whole area where the material will be applied will be cleaned with water. All necessary repairs before using ITC HD2 should be done a few days before using the material.

Application of the material and realization of waterproofing.

Once the work surface is prepared according to the rules mentioned above, the process of preparing the material begins.

For this in a bucket, 25kg bag with material from component A is mixed with about 8-10 liters of material from component B, adding to dry component B the dry material.

The mixing of the material is done by means of a low-speed mechanical mixer, until a homogeneous mass is achieved.

It is very important that the material is used immediately after mixing, because otherwise it may dry out and become unusable.

In order to avoid the emergence of cracks along with the bicomponent material will also be used fiberglass nets.

For this, on the surface to be waterproofed the specialist starts laying the mesh, taking care to lay it out in accordance with the surface configuration. The net will be mounted at least 20cm on the walls, or more according to the technical specifications of the project.

In the case of shower enclosures, the side panels of the cabin will be lined throughout the height with glass mesh.

When laying the net, the first-hand application of the two-component waterproofing material begins, which covers the net placed on the floor and walls.

This process consumes 2kg / m<sup>2</sup> of material.

About 3-4 hours later after the first coat has reached the required drying the second coat of the bicomponent is applied. Drying the first coat may require a little more time depending on weather conditions.

The second coat is thinner than the first and is applied to create a more uniform surface by achieving a better leveling of the surface. This process has a material consumption of about 1.5-2 kg / m<sup>2</sup>.

The application of the material is done with metal screed, brush or roller.

After the completion of the second layer, the surface is left to dry for the necessary time and the entry and passage of anyone is prohibited until the proper drying has been achieved.

Insurance at work.

- In the work environment will be the ambulance box regularly equipped with the necessary materials and medicines
- Workers and specialists will be provided with collective protective equipment.
- Specialists will be provided with special gloves and shoes.

Keeping the environment clean

- Bins for waste disposal, packaging of bicomponent material and waste of glass mesh will be placed in the work environment
- Work tools: tools, brushes, mechanical mixer and all used equipment will be thoroughly cleaned with water without drying ITC HD2.
- Workers will clean the environment, collect work tools as well as collect and store the remaining packaging of the two-component material.

Conservation of the material will be done in dry places.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.7 Fine lime plaster on walls

Fine lime plaster on walls, with appropriate lime on wall surfaces previously plastered and leveled, with dosage: fine lime 3 kg per sqm. The height of lime plaster for corridors and offices is to be decided by the engineer including all other necessary requirements to consider the fine lime plastering completed in a first class manner and ready for painting with synthetic enamel.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.8 Color wash ECO painting in New Constructions

The contractor shall submit to the engineer for approval the brand and quality of the paints he proposes to use.

All paints shall be products that have satisfactory field service. The mixing of different brands before or during application will not be permitted. Mixing and applications of paint shall be in accordance with the manufacturers specifications concerned and to the approval of the engineer. Ironmongery and accessories, machine surface, plates lighting fixtures and similar items in place prior to cleaning and painting, which are not intended to be painted, shall be removed or protected prior to painting operations and repositioned upon completion of painting work as directed. Cleaning solvents shall be of low toxicity. Cleaning and painting shall be so programmed in a way that dust and other contaminants from the cleaning process will not fall on wet or newly painted surface. Brushes, pails, kettles etc used in carrying out the work shall be clean and free from foreign matter. They should be thoroughly cleaned before being used for different types or classes of material.

The staff hired for painting, should be experienced in this field and should follow all technical conditions of painting due to KTZ and STASH.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.9 Painting of the dry wall partitions

Before dry wall partitions painting process, their finishes should be all concluded (gaps filling, bolts places, corners etc).

Wall painting process by color wash painting is as point 6.1.8.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.10 Enamel Painting in New Constructions

Filling and fine-coating timber or metal surfaces with appropriate filler to prepare the surface for enamel painting.

Timber, metal surfaces or the walls will be painted with synthetic enamel with dosage 0.2 kg per sqm for each coat giving a perfect finish and all requirements to complete the work in workmanlike manner.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.11 Painting of steel works

Filling and fine-coating timber or metal surfaces with appropriate filler to prepare the surface ready for enamel painting.

All metal surfaces shall be pre-treated with a single coat of lead primer or suitable oil-based anti-rust with the dosage of 0.08 kg per sqm.

Timber, metal surfaces or the walls will be painted with synthetic enamel with dosage 0.2 kg per sqm for each coat giving a perfect finish and all requirements to complete the work in workmanlike manner.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.12 Painting of wood surfaces

Wood surface painting has two intentions:

- Decor intention.
- Resistance increase (of humidity, intensive light-protection, infection wood protection and the protection of poisonous fungus infection)

The materials used in painting of wood surfaces as usual should fulfill two criterias. All the colors appropriate for wood painting, equipped as well by the certificate should be used.

The works will be executed due to the architect/Supervisor's requirements, but wood surface should be paint at least twice (in same cases of even more times as per the architect/Supervisor's requirements).

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.1.13 Wall covering with slabs of granulated stone, of marble, of stone, etc.

Regarding wall covering with different tile material should be considered the wall type. Walls are external and internal.

It should be considered as well the wall material (rigips, concrete, masonry wall, etc.). According to the constructive wall materials and its surface, wall-tiling methods are classified into two groups:

- Slab splicing by mortar (for unlevelled surfaces)
- Slab splicing by compo (for levelled surfaces)

Regarding splicing of different types of slabs by mortar, the work should follow these conditions:

The basis, in which different slabs type will be spliced, should be cleaned from dust and static.

Mortar composition is equal as described above in point 6.2.1. Mortar thickness should be no less than 15 mm. When mortar is used in external wallpapering it should be frost resistant and water-drawing coefficient in percentage should be less than 3 %. The mortar should fulfill, heating isolation and resistance criteria notice.

Slabs splicing by compo, is realized when basis surface is leveled. Compo can be used as needed in thickness of 3 mm up to 15 mm. All the above-mentioned mortar criterias are valid for compo as well.

After mortar or compo is dried, the planned gaps should be fulfilled by a special material (soil cement).

Edge gaps and wall link should be filled by an elastic solution (as silicon).



Per each surface of 30 m<sup>2</sup> papered by different slabs, it is necessary mobile gaps placing.

Work criterias in gress slabs should follow the criterias mentioned in point 6.2.1 and 6.2.2

Meeting the norms according to the ISO standard

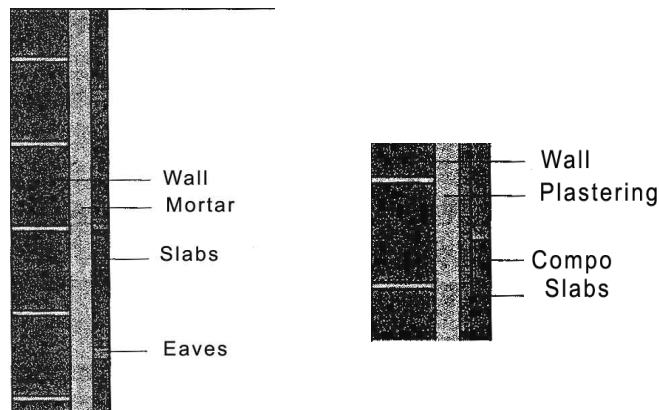
Colors according to the project, painting wood configuration, first quality tiles.

Thickness 20mm, 1200x300mm

All tiles must be resistant to frost and have a high durability.

All the slabs should be frost resistant and be of a high resistance as well.

Slabs' covering is explained in the following drawing.



**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## 6.2 Floor finishes

### 6.2.2 Flooring in Gres Tiles

Tile classification will be done due to these criterias:

- The manner of tile shaping
- Water drawing
- Tile dimensions
- Surface qualities
- Chemical features
- Physical features
- Safety against frost
- Weight/surface load
- Sliding coefficient

The following tables describe some of these criterias.

Water taking in % of tile dimension	
Class	Water-drawing (E)
I	$E < 3 \%$
II a	$3 \% < E < 6 \%$
II b	$6 \% < E < 10 \%$
III	$E > 10 \%$

Loadings classes/ load		
Class	Load	Using area, i.e.
I	Very light	Bedrooms, bathrooms
II	Light	Sitting-rooms, except kitchens and halls
III	Medium	Sitting-rooms, balcony, hotels, bathrooms
IV	Heavy	Offices, halls, shops
V	Very heavy	Gastronomy, public buildings

Considering the needs and criterias to be met, tile should be chosen for each space. The above-mentioned criterias and tables might be useful for their choice.

For schools and kindergartens, the tiles should be of V Classes, by rough surface, in order to provide a safe walking without sliding.

By humidity surroundings (WC, bathrooms and showers) tiles of 1 class should be placed to provide a water-drawing coefficient  $< 3 \%$ .

For this reason before the work begins, the contractor should represent to Supervisor some tile samples, with their production certificate and only after his approval it is allowed the lay them due to, the technical conditions and producer recommendations.

The tiles will be gress porcelain first quality.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.2.6 Skirting and floor junctions accessories

Vertical skirting due to the floor laying are:

- Gress porcelain first quality, for the floor by gress porcelain tiles. They have the same color to the tiles laid on the floor, of height 8 cm and thickness 1.5 cm, spliced by mortar or compo. The mortar for skirting should be in a dosage per sqm: cleaned sand 0.005 m<sup>3</sup>; cement 400, 4 kg and water including plastering, cleaning and any other obligation for the completion of the work in a first class manner.
- By wooden float for parquetry floor. Wooden floats are of the same material with parquet, fixing should be done carefully after placement, leveling; plastering and wood polish using special transparent color.
- With PVC float road for PVC or linoleum floor. The placing manner should be done due to the producer's recommendations and by an experienced staff

- **The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.2.7 Waterproofing for flooring

The waterproofing is to be laid on a dry surface, previously leveled, and including the vertical surfaces, treated with a first layer by bituminous primer coat and layer composed of two membranes bitumen reinforced with mineral fibbers, each with the thickness of 4 mm, fixed by torch, with the membranes placed at right angles to each other on plane, sloping or vertical surfaces, ensuring that the cover of joints has a minimum of 10cm and also to be raised vertically in the sidely walls of min 10 cm.

#### 6.2.9 Parquet floor for physical education halls (according to the standard of specifications HRN EN 13266: 2010)

##### Floors for gyms

Specifications and requirements for parquet:

The floor must meet the norms for sports and gymnastic facilities. The floor surface will be paved with oak wood flooring.

This layer is fixed on deformed fir material (22mm thick).

The layer for each parquet tile should not exceed the size 1x1m.

The surface should be rough and one or two coats of varnish should be applied.

All channels and protrusions of the parquet tile should be well glued to each other, so as not to create protruding surfaces in the parquet layer.

Before applying the last coat of varnish, the surface should be polished, polished and then cleaned.

Siperfaqes se shtruar I duhet hedhur dy here llak smalti dhe duhet trajtuar.

Ndryshimi ne nivelimin e siperfaqes duhet te jete maksimumi 2 mm per 10 m gjatesi.

Enamel varnish should be applied twice on the paved surface and treated.

The change in surface leveling should be a maximum of 2 mm for 10 m length.

Conditions of sub - structures:

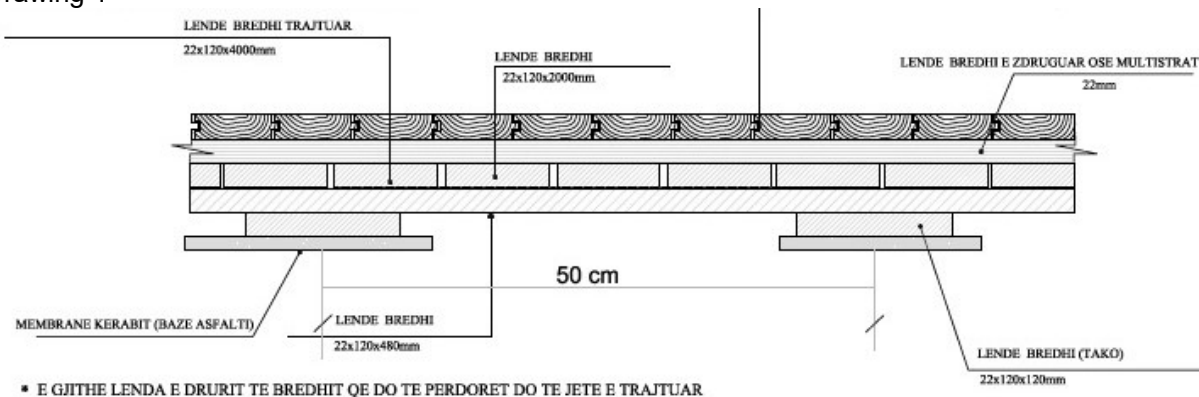
- Last layer of concrete at least 15 cm strong (B200)
- Waterproofing (at least with two layers of tar cardboard)
- Thermal insulation (polystyrene tiles 5 cm)
- Styrofoam at least 4cm
- Asphalt based carbide membrane
- The composition of the parquet floor

#### 1. Construction of parquet floor

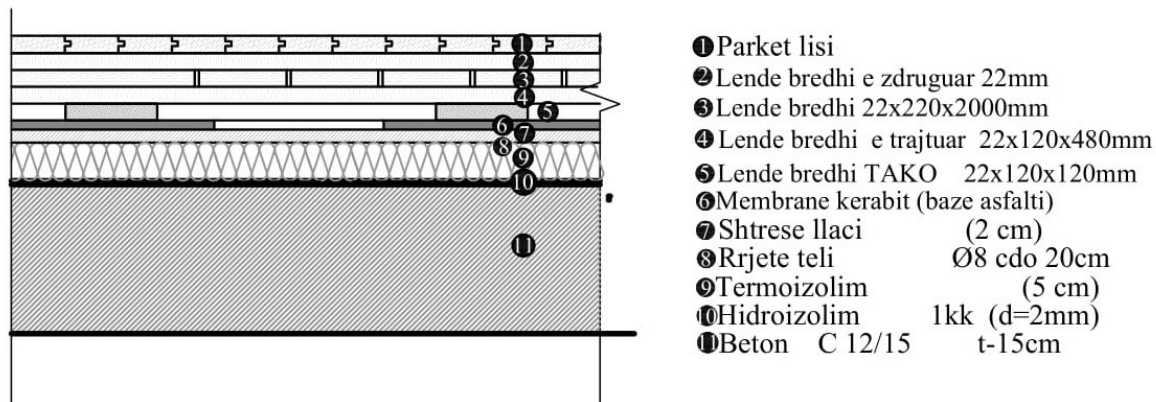
- As a surface layer is the parquet made of oak wood with a thickness of 22mm
- Below the parquet layer is placed a thinned fir material with a thickness of 22mm

- The next layer is fir material with dimensions 22x22x480mm
- Then the treated fir material, size 22x22x120, is placed
- The treated fir material is based on Tako with dimensions 22x120x120mm
- The last layer of the wooden base is the Kerabite membrane with asphalt base and thickness 11mm

Drawing 1



Vizatimi 2

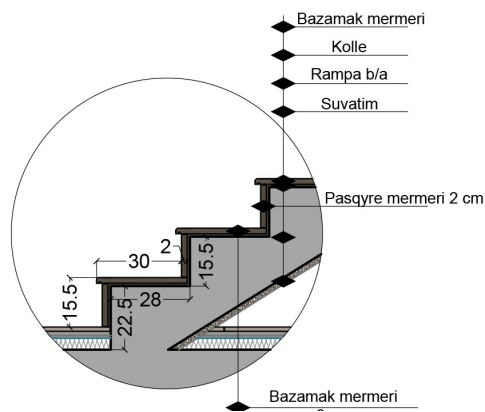


The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.

### 6.3. Stair Finishes

#### 6.3.1 Stairs lined with marble bases.

Before starting the works, the contractor must submit to the Supervisor an example of the material, which he will use and the production certificate, which must contain the above conditions and after approval to start working.



Installation and cladding of marble bases for the stairs should be done by a specialized staff and in accordance with the technical conditions.

Before laying the marble bases, the floor should be cleaned very well with pressurized water, and dried very well. Adhesive is needed to connect. It should be used in the amount of 400 kg / m<sup>2</sup>.

The thickness of the marble in violation is 2cm and in the glued front part it is 2 cm.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### 6.3.2 Metallic banisters (handrails)

Handrails perform various functions in the constructions. They offer support and security while walking on the stairs. They also play a special role in the beauty and the architectonic view of a construction. Handrails have to be at least 100 cm high. In cases when the length of the stairs is more than 12 m, handrails must be 110 cm high. The range 100/110 cm shall also depend on the space of the resting ground.

Handrails are mounted on or by the sides of the stairs. They must be properly fixed in order to guarantee their stability and firmness. The handrails shall be either covered with wooden elements or secured with wooden or metal bars. The space between them must be less than 12 cm.

In cases when the stairs are wider than 100 cm, in order to secure a safe walk, it is necessary that handrails be mounted at the walls on the other side of the stairs. The handrails on the stairs shall not be lower than 75 cm and higher than 110 cm. In the cases of schools those shall be placed at a height of 80 cm. These handrails shall have a distance of at least 4 cm from the walls.

Handrails should be made of a material and shape as to allow a gentle and harmless touch. It is recommended that they be made of wood in order to avoid the cold impression created by the steel rails.

A sample of metal banisters can be seen in the following pictures.



#### 6.3.3 Vertical and other accessory borders

- Marble, for stairs with marble. The marble grinder should be 8 cm high and 2 cm thick and placed on the work with cement mortar 1: 2 or with a adhesive material.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6 .3.4 Metal emergency stairs

According to the norms, the metal emergency stairs are realized at a distance of 30 m, meeting the requirements for the flow of people in case of evacuation.

It should also be coated with wire mesh for the safety of users.

Notes:

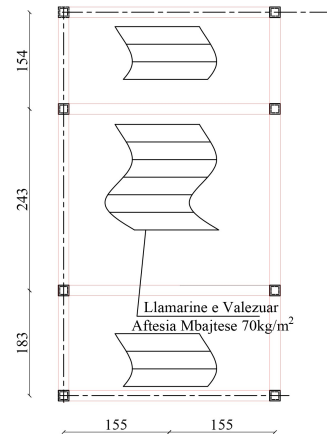
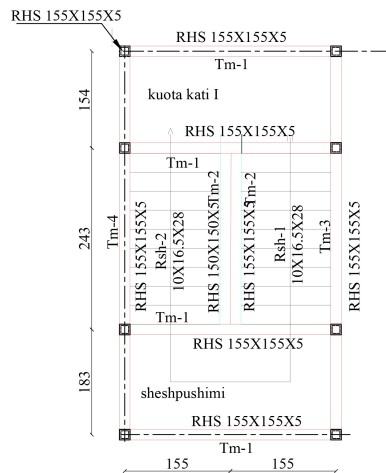
1. The calculated metal elements are s275 (en 1993-1-1)
2. The anchoring of the column in the elements b / a will be with bolts with a diameter of 20mm
3. the bolts will be placed in the elements b / a only with the resin which will realize their connection to concrete. their placement without resin is not allowed in any way.



3. All details must be realized according to the drawings

PLANI I SHKALLEVE METALIKE

PLANI I MBULESES SE SHKALLEVE  
METALIKE



### Covering of metal stairs

-Metal construction of stairs to be realized with quadrangular metal pipes without folding (molded) with 5mm splitter with 275s carbon steel and weldable

-Junctions of metal profiles (in the form of quadrangular tubes) will be made along the entire contact surface

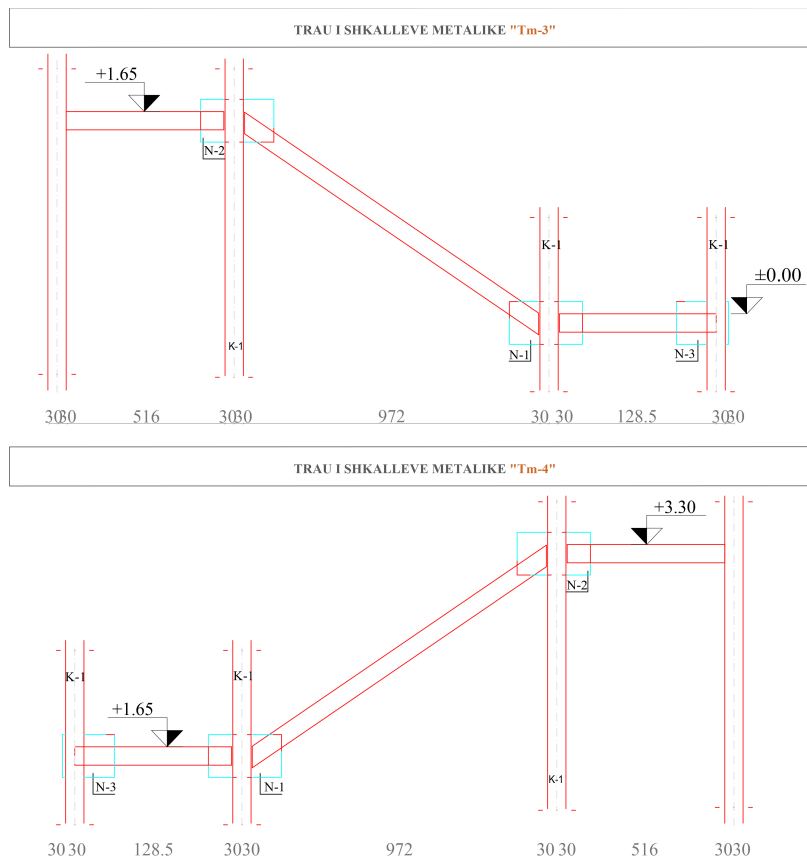
The electrodes to be used must have temporary resistance to break > 4200kg / cm / (or ti-viis type electrodes and the like).

-Welding of ladder elements should be performed with a generator so that the walls of the profiles do not burn, the height of the welding seam in all cases should be 5mm and the length of the seam should be 80mm.

All elements of the ladder after being cleaned of rust are painted with one coat of anti-rust paint and two coats of oil paint, the color of which is determined by the architect.

1. The calculated metal elements are s275 (en 1993-1-1)
2. The anchoring of the column in the elements b / a will be with bolts with diameter 20mm
3. The bolts will be placed on the elements b / a only with resin which to realize their connection with concrete. it is not allowed to place e them without resin in any way.
4. All details must be realized according to the drawings





**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### 6.3.5 Zincing / galvanizing

*Zincing or galvanizing of steel elements, to build galvanized (galvanized) metal structures.*

Hot-dip galvanizing of steel elements is important to be done according to the ISO standard. The galvanizing process must protect the metal structure from atmospheric conditions, mainly corrosion, for a long time, with a guarantee of 25 to 30 years.

Hot-dip galvanizing technology must have a lifespan of over 25 to 30 years,

To increase the lifespan of the construction, so as not to have maintenance costs. It should meet the quality of clothing and be material without side effects, against people.

Galvanization must be completely non-toxic material. Galvanized surface must be completely uniform, without defects, or without parts not covered with zinc.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## 6.3 Windows and Doors

### 6.4.1 General information

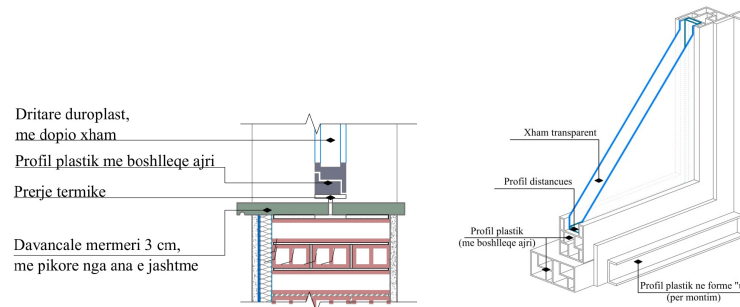
#### 6.4.1 Windows

**The PVC windows** will be composed by:

- the PVC frame (width 58 mm) to be fixed to the wall by mean a proper steel before plastering. The PVC Frame will be provided by hinges and lock anchors
- the sashes to be screwed to the frame after plastering and painting.
- • Open glass shutters (4 mm thick when transparent and 6 mm thick when reinforced with wire mesh or double glazing) and will be fixed to the window at three anchored points, handles and locks.
- Water collecting pits
- Slide rollers and blind frame;
- Galvanised steel reinforcement and other accessories
- Gasket grooves
- Handles and lock anchor
- Special wool pile fin seals for insulation

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 6.4.3 Windows – Installation



**Supply and installation of plastic windows with double glass filled with argon gas, thermal cut and acoustic insulation,  $U=2 \text{ W/m}^2\text{K}$ ; standard ISO EN 9002.**

Supply and installation of windows is done as described in the technical specifications with dimensions given by the contractor, consist of PVC material whose profiles are according to European standards ISO EN 9002. The color of the window will be at the request of the investor. The gap inside the double glazing should be 20-24mm.

PVC window systems must provide perfect insulation from air and water. They must provide water resistance below 500Pa (equivalent to wind speeds of 150km / h). Tests for this must be in accordance with DIN 18055. The coefficient of thermal conductivity must be  $2.0 \text{ W/m}^2\text{K}$  which confirms the European Standards. With regard to sound insulation, PVC windows should provide sound insulation up to 4 degrees ( $> 40\text{dB}$ ).

The fixed window frame (partitions) will have a dimension of 74-116mm. They are provided with elements that serve to place and anchor in the wall structures as well as the protruding parts that serve to slide the window frame. The shape of the profile is tubular in order to collect all its

accessories. The profile of the window frame will be 25 mm which will be covered by the main profile that will be fixed to the wall.

Both fixed or movable frames are designed and constructed with air joints that serve as thermal fractures. They must offer application of European Standards of glass placement (Glass at 4-6mm, double glazing 20-24mm, triple glazing 24-28 mm), with water drain with water collector, with 2 inclination to ensure perfect water drainage , perfect closure by central closures, wall thickness reaching EN (t-3.1mm), wind and rain insulation unique gutter designed to assist the installation of tarpaulin materials, which serve this purpose. The characteristics of the adhesive against atmospheric agents must be tested by a certified test performed by the window frame manufacturers or by the profile manufacturers.

Glass panels (4mm thick when the glass is transparent and 6mm thick when reinforced with wire mesh). According to the investor's request, PVC windows will be double glazed (20-24mm)

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **6.4.4 Doors -**

##### **Doors - components**

The parts of door are depending by the kind and material of doors. The parts of doors will be for each type of doors as follows:

##### **a- Internal Doors in solid wood**

Supplying and fixing of doors, which dimensions will be taken by the Contractor, in seasoned Pine, treated with a coat of wood preservative, composed by:

- a sub-frame in seasoned pine wood (thickness 3 cm) treated with a coat of wood preservative, dimensioned according to the width of the wall (increased of the various wall coating) strongly anchored to the wall by mean of steel clamps (every meter) and cement mortar.
- A wooden frame to be screwed to the sub-frame after plastering and painting. Following the door design shown in Technical Drawings, the frame will be provided by hinges and lock anchors for sash- doors, casement-doors, garret-doors, highlight, etc.
- Timber door opening made up by a solid wood frame (10 x 4 cm min. section) with horizontal and vertical members of the same section every 40 cm. In the bottom part the lowest horizontal member will be 20 cm height. Panels of seasoned Pine (3cm thick) treated with a coat of wood preservative and inserted between the wooden members complete the door panel structure which will be provide by 3 hinges 16 cm long min.
- A metal lock and Yale type key in 3 copies, brass door handle and push-plate.
- All works of bricklayer and all requirements to complete the work in a first class manner are included.

As above but with glass panels as described in the Technical Drawings. The glass panels could be transparent (4mm thick min) or wire-net reinforced (6mm thick min.)

As above but for air conditions spaces: In the bottom part of the door panel, a small opening, supplied by a proper grating, aluminium made, is required for the air conditioned system working.

As above but with highlight. The upper part of some of the internal doors to the corridors where indicated in Technical Drawings will have highlight openings, supplied by glass panels reinforced by wire-net.

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#### **b- Internal Doors "light core"**

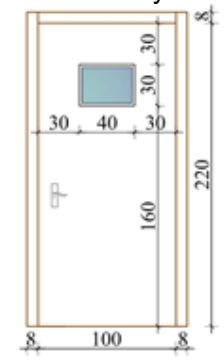
Supplying and fixing of doors, which dimensions will be taken by the Contractor, in made up by:

- a sub-frame in seasoned pine wood (thickness 3 cm) treated with a coat of wood preservative, dimensioned according to the width of the wall (increased of the various wall coating) strongly anchored to the wall by mean of steel clamps (every one meter) and cement mortar.
- A wooden frame to be screwed to the sub-frame after plastering and painting. Following the door design shown in Technical Drawings, the frame will be provided by hinges and lock anchors for sash- doors, casement-doors, garret-doors, highlight, etc.
- door opening made up by two melamine laminated panels and intermediate solid wooded strips provided by a security lock. The two laminated panels will be 8 mm thick, all door border will be protected by a solid wooden strip and the total thick of the doors will be 4,5 cm min.
- A metal lock and Yale type key in 3 copies, brass door handle and push-plate.
- All works of bricklayer and all requirements to complete the work in a first class manner are included.

As above but with glass panels as described in the Technical Drawings. The glass panels could be transparent (4mm thick min) or wire-net reinforced (6mm thick min.)

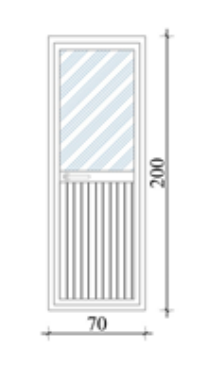
As above but for air conditions spaces: In the bottom part of the door panel, a small opening, supplied by a proper grating, aluminium made, is required for the air conditioned system working.

As above but with highlight. The upper part of some of the internal doors to the corridors where indicated in Technical Drawings will have highlight openings, supplied by glass panels reinforced by wire-net.



**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

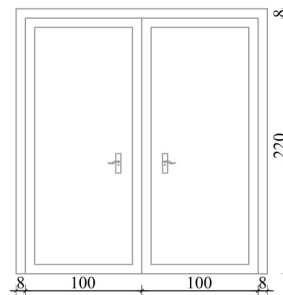
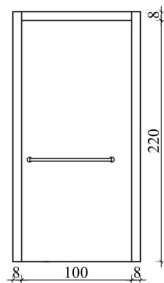
**Internal duraluminium Door composed by:**



- a fixed aluminium sub-frame, type tubes profile, with depth 61-90 mm to be fixed to the wall by mean of proper steel clamps. A cover that will be 25 mm from the walls will cover the fixed profile of subframe.
- a moving aluminium frame with depth 32 mm and height 75 mm to be screwed to the sub-frame after plastering and painting. The profile should have a central space required for the insertion of the corner joints (with a space of 18 mm for the placement of the glass) and the rollers for their slides.
- The glass panels will be tempered and triplex bombarded glass
- A metallic lockset with three copies of keys , door handles and push handle

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

**Refractory metal exterior doors::**



- Fire doors are resistant to temperatures and fumes , the interior is made of insulating material with different protections and accessories depending on the needs of the constructor.
- The door leaf is made of galvanized sheet metal 8/10 with a thickness of 60mm. The case is made of sheet metal thickness 15/10 reinforced on all four sides by a metal element
- Standard cylinder bracket equipped with protective cap and steel coating
- The door is equipped with an anti-panic system which is realized by a lowering handle e self-closing lift

Door accessories

Hinge placed two pieces for each sheet

The hinge consists of: the lower part with a recordable video, the upper part comes in spherical shape which has a bearing capacity of up to 160kg and with a number of revolutions 2000 cycles suitable for fire doors

The safety pin is placed on the vertical side of the door

Lock with cylinder and central locking according to European standards CE EN12209

The glove is fire resistant with steel cover

Patented metal plate according to the cylinder

The glove cover is made of plastic wrap.

The latch for closing the fixed flap works by means of a hook through which perform opening and closing of the fixed flap

The upper latch guide helps to insert the latch into the Door Case

The bottom guide of the latch pin helps to insert the latch into the floor which assisted by a bronze lid placed on the floor

The door shock absorber is a device that serves to close the door.

The device contains two regulators, one for power regulation and the other for speed adjustment.

Antipanic gloves have these characteristics

- Available in combination with stainless steel with chrome aluminum foil
- Possibility of locking on one side and opening by anti-panic glove on the other
- Suitable for left or right opening doors

#### **6.4.11 Doors - INSTALLATION**

The installation of door should be made in accordance with technical condition of installation. The installation is depending by the kind and material of doors. The installation way of doors will be for each type of doors as follows:

**Internal seasoned Pine wooden Door**, treated with a coat of wood preservative, will be installed as follows:

- a wooden sub-frame with seasoned Pine wooden (width 4 cm), treated with a coat preservative to be fixed to the wall by mean of proper steel clamps before plastering
- a wooden frame to be screwed to the sub-frame after plastering and painting. Following the doors design shown in Technical Drawing, the frame will be provided by hinges and lock anchors for all kinds of doors. There will be fixed all wooden cover and safety band and lockset. The total thickness of doors will be minimum 4,5 cm.
- A metallic lockset with three copies of keys type Yale or similar, door handles and push handle

**Internal aluminium Door** will be installed as follows:

Installation of duralumin interior doors given in the Technical Drawings, the dimensions of which are given by the Customer, will be done by assembling duralimini profiles (fixed frame and movable frame) according to the European standard EN 573 - 3 and painted, when the plastering of the shoulders is finished or the coatings with marble tiles are placed, etc. Both parts (fixed and movable) must be designed to make doors that break the heat and have two

duralumin profiles, which are joined to each other by two rubber waterproofing strips or plastic material.

A solid case must be carefully fixed with iron screws to the wall and inside the cement mortar. The fixing must have a distance from the corners not more than 150 mm and between the fixing parts not more than 800 mm. Fixed door frames will be joined to the frames after plastering and painting is completed. The gaps are filled with elastic plastic material and then their skating is done using skating grout.

The glass shutters will be placed on the door frame and will be attached to three hinged anchorage points. Metal or duralumin locks and handles will also be fitted. The filling between the case and the wall of the building will be done using plastic-elastic material after it has been filled with the appropriate waterproofing material. Between the inner frame support and the duralumin outer part it is preferable to maintain an installation tolerance of 6 mm, considering the fixing space about 2 mm.

**Refractory metal exterior doors** will be installed in accordance with the requirements of the state standard for their installation as follows:

- a metal frame is fixed to the wall by means of steel hooks or by concreting the wall before plastering. The metal case must be painted with metal paint against corrosion before being mounted on the object. Its size depends on the thickness of the wall where it will be placed. The door leaf is made of galvanized sheet metal 8/10 with a thickness of 60mm. The case is made of sheet metal thickness 15/10 reinforced on all four sides by a metal element
- The armored door frame is fixed to the case after plastering and painting. The shutter will be secured with hinges and key anchors when installing the door opener. In this shutter will be placed the security elements as well as all the necessary accessories.
- The door frame has inside (between the sheets of sheet metal) metal safety rods with a minimum diameter of 16 mm which are placed at a distance between them of at least 30 cm. They must be welded to the metal frame of the armored door frame.
- High security locks with secret central locking are mounted on the door frame by means of steel screws

The door frame should be painted with enameled, transparent paint before fixing the door.

All work related to the installation and placement of doors in the building must be done according to technical requirements.

#### **6.4.12 The doors frames**

The doors frames are depending by door type and materials that are used for their production. They could be metallic, wood or aluminum. For each doors types, the frames are as follows:

**The internal doors by pinewood**, treated with wood protective cover, placed in case by pine wood beam 7 x 5 cm and pressed board (with thickness 4 cm) dimensioned according the wall width (considering the increase by wall cover). The frames is well fixed in the wall with screws, iron cramp and covered with lime cement mortar.

**The internal doors by aluminum** placed in stable frames in the form of tubular profiles by aluminum with dimensions 61-90 mm, which is to be provided by special elements for the fixing



and nailing in the walls structure. Stable profiles of frames will be with a cover, which is 25 mm inside the wall.

**The outside metallic doors** will mount in metallic frame, which is fixed in wall through the steel cramps of concrete casting in the wall before the plastering.

The metallic frame should be painted with metallic color against corrosion, before it will be mounted in object. Its size is depending by wall thickness, where it will be placed. The leaf thickness of case steel should be minimally 1,5 mm. The width of lateral parts of case should be minimally 10 cm while the width is depending by wall width and door type. The steel leafs of frame should welled according to Technical Requirements of Implementation and should be painted with enameled color before the door fixing.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **6.4.13 Doors – Locksets**

Supplying and fixing of lockset type Wally or Yale, as described in the Technical Drawings, made up in steel will be in accordance with quality standards. They are composed by:

- Strike
- Latch with their bolts
- Solid steel chassis
- Keys
- Handleset.

The locksets can be:

- 1) Tubular Locksets,
- 2) Tubular leversets,
- 3) Cylindrical locksets
- 4) Cylindrical leversets.

1- If the Contractor will install **Tubular locksets**, their technical data should be as follows:

- Solid steel chassis and latch case, zinc plated for corrosion
- Guaranteed for over 150 000 life cycles
- Exposed trim should be made of either wrought stainless steel or brass. 2-pieces reinforced knob as standard, esthetic 1 piece knob available upon request,
- Locksets should be keyed alike with deadbolt to improve security,
- Locksets should be master keyed in a simple combination and facility use,
- Locksets should be easy to install.
- The thickness of strike should be 1 mm and the size of strike should be 45mm x 57 mm,
- The depth of latch should be 60 - 70 mm,
- Handing should be fully reversible for left or right hand doors,
- Door thickness adjustable 35 mm to 50 mm as standards or 50 mm up to 70 mm in special cases,
- Yale type keyway is applied as standard but other keyway options are available upon request.

The tubular locksets can use for Entrance, Privacy or Passage.

For Entrance doors will have:

- Deadlocking latch bolt
- The key or thumb-turn locks and unlocks both knobs
- Turning the inside thumb-turn counter-clockwise or the key will lock both knobs. Turning in opposite direction will unlock knobs

For Lavatory or other Privacy doors will have:

- Either knob operates latch bolt unless knobs are locked by inside thumb turn
- A coin inserted and turned in emergency slot will unlock door from outside.

For doors that do not require locking will have:

- Either knob operates latch bolt at all times
- Suitable for use on storeroom, kitchen and children bedroom

2- If the Contractor will install **Tubular leversets (They are especially convenient for children and handicapped)**, their technical data should be as follows:

- Solid steel chassis and latch case, zinc plated for corrosion
- Guaranteed for over 150 000 life cycles
- Exposed trim should be made of zinc die-casting electro-plated or solid brass,
- Locksets should be keyed alike to deadbolt to maximize security,
- Locksets should be easy to install.
- The thickness of strike should be 1 mm and the Diameter of strike should be 67mm.
- The depth of latch should be 60 - 70 mm,
- Handing should be right hand as standard,
- Door thickness adjustable 35 mm to 50 mm as standards,
- Yale type keyway is applied as standard but other keyway options are available upon request.
- Backset should be adjustable to either 60 – 70 mm.

The tubular leversets can use for Entrance, Privacy or Passage.

For Entrance doors will have:

- Deadlocking latch bolt
- The key or thumb-turn locks and unlocks both inside and outside trims
- Turning the inside thumb-turn counter-clockwise or the key will lock both trims. Turning in opposite direction will unlock trims

For Lavatory or other Privacy doors will have:

- Inside or outside trims operates latch bolt unless both trims are locked by inside thumb turn,
- A coin or a pin inserted and turned in emergency slot will unlock door from outside.

For doors that do not require locking will have:

- Inside or outside trims operates latch bolt at all times
- Suitable for use on storeroom, kitchen and children bedroom

The cylindrical locksets can use for Entrance, Privacy, Passage or storeroom.

For Entrance doors will have:

- Deadlocking latch bolt
- Pushing button in inside knob locks outside knob.
- Inside knob always active
- Turning inside knob or key from outside will unlock latch
- Either knob operates latch bolt except when outside knob is locked from inside

For Lavatory or other Privacy doors will have:

- Either knobs operates latch bolt unless outside knob is locked by push-button inside,
- A coin inserted and turned in emergency slot will unlock door from outside.
- Inside knob always active
- Pushing inside button locks the outside knob

For doors that do not require locking will have:

- Either knobs operates latch bolt at all times
- Suitable for use on storeroom, kitchen and children bedroom

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **6.4.14 Hinges**

Supplying and fixing of hinges, as described in the technical drawings, made up in steel and covering with brass layer will be in accordance with quality standards OTLAV's. The steel material should provide high resistant of hinges against mechanical shooting, elasticity, long working life (180 000 life cycle).

The hinges should be composed by:

- Matchstick made up in steel and covered with brass layer, type male with file;
- Matchstick made up in steel and covered with brass layer, type female;
- Four steel screw. They will be used for installation of hinges in object.

The size and Form of parts should be given in Technical drawings.

Two above matchstick will be moved in their part in a way that the doors to move in a easy way at their case. The matchstick will be painted with oil to eliminate the sound during their works.

The hinges that will be used for doors should be composed by two above matchstick and four steel screw. The diameter of matchstick with file, type male should be 14-16 mm. The length of matchstick is  $L_1 = 60$  mm and length of file will be minimum  $L_2=40$  mm. This matchstick will be fileted with door case in accordance with technical drawings. The head form of matchstick will be in same with chess piece. Metallic matchstick, type female will be installed to other part of door by 4 metallic screw

The hinges that are installed in under part of door should be minimum 25 cm over the under part of door case.

The hinges that will be used for windows should be composed by two above matchstick and four steel screw. The diameter of matchstick with file, type male should be 12-13 mm. The length of

matchstick is  $L_1 = 50$  mm and length of file will be minimum  $L_2 = 30$  mm. This matchstick will be filed with door case in accordance with technical drawings. The head form of matchstick will be in same with circular form. Metallic matchstick, type female will be installed to other part of window by 4 metallic screw. The hinges that are installed in under part of window should be minimum 15 cm over the under part of window case.

Three hinges will be installed in three anchor points of door and window in minimum distance between them as follow:

$L_{min} = 50$  cm for door

$L'_{min} = 30$  cm for window.

The quantity of hinges will be in accordance with project requirement. They will be depending by kind and size of door or windows.

All works of installation and fixing of them in the object should be perfect and in accordance with the project and Supervisor's technical requirements.

A sample of hinge with their quality certificate, origins certificate and warranty certificate must be previously submitted to the Supervisor for initial approval before installation on the object.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **6.4.15 Door handle**

##### **General**

All door/window handles should be of a similar type all over the school area. In order to meet this requirement all door handles should be of such a design that can be used both in dried and humid environments.

##### **The criteria that should be met**

All door/window handles should be:

- a) With a high level of usage security (longevity while being frequently used)

Handle's durability depends mainly on the materials, that they are made of and also on the way of the handle's connection with the other elements (cylinder, lock) etc.


For this reason a handle produced from a strong and resistant material (for example, stainless steel) has to be chosen.

- b) With guarantee period for resistance against all charges (it should guarantee durability in all mistreatment cases: hanging, hits, crashes etc)

Considering users of those handles, they should have high resistance coefficients in charges; handles should also resist a child hanging on it.

Due to the European Norms (DIN) there are two resistance levels.

The following table presents the charges for these two levels. We would suggest the level ES2.

Properties	Requirements		
	ES1	ES2	
Concentric Tensile Loading	25 kN	40 kN	
Tensile Loading of the Barrel	15 kN	17 kN	
One Side Tensile Loading	15 kN	20 kN	

c) It should not cause any physical damage during the usage.

Regarding this item it could be said that, since these handles will be fixed in doors and windows of kindergartens, elementary schools, secondary schools and high schools, and therefore will be partially used by children, these handles should be chosen appropriately in order not to cause any physical damage to the child. The handle model presented in the following figure meets all the requirements by its part from inside of the classroom, since this part frequently used, especially in emergency cases, for the door is opening from inside of the classroom to outside.

### Fixing

All handles before being fixed should be checked by the engineer (supervisor) and only after his approval to be fixed.

The handle fixing should be done in such a manner in order to meet the above-mentioned criteria.

The instructions given by the handle producers must be correctly applied while handle fixing.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## 6.5. Ceiling Finishes

### 6.5.1 Plastering of ceiling

Warning:

All surfaces to be plastered must be previously carefully wet by clean water. Where necessary appropriate additives will be added to water in order to guarantee a perfect plaster issuing. In any case the Contractor is the only responsible of the final issue of the plastering works.

Cement-mortar type 25 with river sand (which porosity of 35% and water content with relevant increasing of volume by 20%) mixed in proportion of cement: lime: sand=1:0.5:5.5, 87 lit hydrated lime, 300kg cement (type 300), 1.01 m<sup>3</sup> sand.

Cement-mortar type 1:2 with clean sand (having a porosity of 35%) mixed in proportion of cement: sand=1:2 527 kg cement (type 400), 0.89 m<sup>3</sup> sand.

Those proportions of using mortar are worth only for 1 m<sup>3</sup>. These standards are based on legal manuals and advice books like:

Manual no.1 of "Technical Analysis for the production of building materials, advices and criteria"

Methodology of Work:

-Preparation of ceilings with a first rough-cast coat of render, using a fluid cement mortar for improving the adherence of the render and to reinforce the surface, including scaffolding and all requirements for the completion of the work.

-Plastering composed of one layer of lime mortar (type 25) 2 cm thick with the following dosage per square meter: 0.005 m<sup>3</sup> clean sharp sand , 0.03 m<sup>3</sup> lime mortar (type 1:2), 6.6 kg cement (type 400) water, using appropriate profiles and guides applied to ceilings and trowel finished to a smooth surface, including scaffolding and all requirements to complete the work in a perfect way.

-Painting works of ceiling.

Careful cleaning, bushing and smoothing of all the plastered surfaces to be later on ceilings new painted.

Painting of the ceiling with "hydromat" paint, in two layers minimum. Colours as indicated in technical drawings, to be approved by Contract Administrator.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### **6.5.2 Drop ceilings**

#### **Specifying ceilings**

Ceilings are customarily set out so that the cut panels at the perimeter are equal or greater in width than ½ full tile module. They should be cut to a good fit.

On 600mmx1200mm items and plank items the direction of installation should be indicated on the ceilings plans. It is recommended practice to install products with directional face patterns in square modules, with the direction of the pattern alternating from tile to tile.

The grid is primarily intended to support the distributed load of 4 to 6.5 kg/m<sup>2</sup> from ceiling tiles or panels. This will ensure a deflection of the grid, between points of support, which is visually undetectable. On no account should point loads be placed on reduced height or lightweight cross tees and only very lightweight fittings, of 3 kg or less, should be supported on the grid flanges. Main runners or cross tees which bear on a perimeter trim should be suspended within 600mm so that excessive loads are not transferred into it. However, this dimension may need to be reduced to 450 mm or less if additional loads overlays or service fittings are installed.

#### **Installation conditions**

The required stability of site conditions is only likely to be achieved if the building is weatherproof, dried out, fully glazed, and during the winter months some form of dry heating is provided. Increased ventilation should be used to reduce excess heat build up during the day caused by solar heat gain.

Controlled ventilation should be used to disperse moisture-laden air. Mechanical de-humidifiers are designed to reduce the moisture content in the air within the building. The direct burning of fossil fuels such as butane or propane gas is not recommended as these liberate approximately 2.2 liters of water for every 500 g of fuel burnt. It is better to use dry heat such as electricity or indirect hot air and to use de-humidifiers only to reduce the % RH created by moisture emitting from structure.

#### Maintenance and cleaning

Maintenance on suspended ceilings should only take place after the effect of such work upon the technical functions of the installation (in particular the fire and acoustic performance), has been fully considered. If in doubt, please consult the internal technical sales.

However, when maintenance is necessary, certain procedures should be followed to ensure continued high performance and attractive appearance.

#### Cleaning

First remove surface dust from the ceiling using a soft brush. Pencil marks, smudges etc. may be removed with an ordinary art gum eraser. An alternative method of cleaning is with a moist cloth or sponge dampened in water containing mild soap or diluted detergent. The sponge should contain as little water as possible. The ceiling must not be made wet. After washing, the soapy film should be wiped off with a cloth or sponge lightly dampened in clear water.

- Abrasive cleaners must not be used.
- Ceramaguard ceilings are unaffected by moisture and can be made damp with no adverse results.
- Parafon Hygien and ML Bio Board can be repeatedly washed and will withstand mild detergent and germicidal cleaners.
- Specialist contractors offer cleaning services using chemical solutions. Where these methods are employed, it is recommended that a trial operation is first carried out so that the result and overall effect can be assessed. It is best in this case to conduct such a test in a non-critical area of building.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## 6.6 Ceiling Finishes

### 6.6.1 Cover on angle of the walls

The supply and fixing of cover on the angle of the walls are described in technical specifications that are given by Contractor. They will be made up to aluminium material with profile type **L** in accordance with European standards EN 573-3, The profile will be painted before their installation on the wall. Their colour will be according to the requirement of Investor (usually, can be used the white colour).

The sizes of cover on angle of the walls are 150 cm x 2 x 2 cm. Their form is in it with **L** Profile. The thickness of profile is 2 mm.

Profile consists of two bands with width 2 cm per side. The profile can be with hole with d= 6-8 mm that will be used for fixing of cover on the walls. In this case, the cover will be fixed on the wall before the plastering of walls. Both sides of profile should be covered during the plastering of walls.



The parts of aluminium profiles should be painted during the baking process *lacquering*. Baking temperature should be less than 180 celsius degree and the baking period should be less than 15 min. The profiles will be powdered with first quality of acrylic *resin or linear polyester*.

The covers on the angle of walls are protected by elements that provide their putting and anchoring on the wall structures

The cover will be jointed with wall by a special plastic-elastic material that is used for aluminium profile. The pasting will be made with a brush after the plastering of walls. The characteristics of paste (glue) for resistant against the atmospheric agents should be provided and certified by manufacture.

For protection of walls angle can be used pine wooden cover that are protected by special wooden material (special paint with wooden material). In this case, the thickness of their profile should be 3-5 mm and the sizes should be 150 x 3 x 3 cm. The connection of two wooden bands will be made with small rivets. Their place should be painted after the finish of works. In the connection part, the wooden bands should be cutting in 45 degree.

All works of installation and putting of cover on the angle of walls should be perfect and in accordance with the project and Supervisor's requirements.

A sample of cover on the angle of walls with their quality certificate, origin certificate and warranty certificate must be previously submitted to the Supervisor for approval before installation on the object. Supervisor can required increasing their length till 2 m.

#### 6.6.2 Double glazed fix glassis with PVC frame

Fiz glassis- Supply and installation of double glazed fix glassis with PVC frame as described in the technical specifications with dimensions given by the contractor, consist of duroplast material whose profiles are according to European standards and are painted profiles before being placed in the building. Their color will be at the request of the investor.

The fixed frame of the fix glassis will have a dimension that will be determined by the technical drawings. They have elements that serve to place and anchor fix glassis in wall structures. The shape of the window profile is tubular in order to hold all its accessories. The profile of the window frame will be with dimensions not less than 25 mm so that the main profile that will be fixed to the wall will be exposed.

Fixing the fix glassis with solid countertop will be done carefully with the iron bands to the wall with mortar (with fillet caps). The placement (fixing of the window) should have a preferable distance from the corner of the frame not more than 150 mm and between them not more than 800 mm. The fixed frame of the fix glassis will be screwed with wire after finishing plastering and painting. Open folds with glass will be placed with hinges on the skeleton of the window and will be equipped with locking locks and handles. The gluing and filling between the frames and the composition of the building will be done using elastic-plastic materials, after closing each crack with insulating material. Between the inside of the iron support frame and the outer fixed frame of duroplast it is preferable to maintain an installation tolerance of 6mm, considering an outlet of the fixing space of about 2 mm. Dimensional tolerance and thickness will be according to European standards.

The glass panels will be fixed to the duroplast frame by means of aluminum slats in the duroplast profiles of the window and accompanied by rubber. All work related to the masonry and all other requirements for the completion of the work must be done with quality.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **6.6.4 Horizontal wall protection**

Supplying and fixing the cover of walls described in technical specification given by administrator contractor.

Cover of walls are composed by woods material and these are pre-painted profile before fixing on the walls. Color of cover of walls depend on investor requirement.

Cover of walls have a size 10 - 15 x 2 cm and their length is depened from the room dimensions. Thickness of profile is 2 mm on each side of profile should be a strip form with wide 2 cm from each side or it should be with holes with  $d = 6 - 8$  mm. The hole is using to fix the cover of walls in a first-manner class work. In this case the cover of wall is fixed on the wall before plastering. During plastering two sides of covers are foiling with protection papers.

Horizontal wall protections should be placed in a height of funksion of chair height.

Cover of walls are ensuring with elements that serve for placing and anchoring on wall structure. The sealing between cover of wall and wall will be carry out by using plastic-elastic materials, after having filled any gap by plastering.

We can use the wooden cover of walls in seasoned pine, treated with a coat preservative. In this case the thickness of profiles will be 3-5 mm and size will be 150 x 3 x 3 cm. Joining of two wooden strips will be carry out with small nails and after that it has to plaster and paint. On part of joining the wooden strips has to cut with an angle 45 grades.

All works of installation and putting of cover on the angle of walls should be perfect and in accordance with the project and Supervisor's requirements.

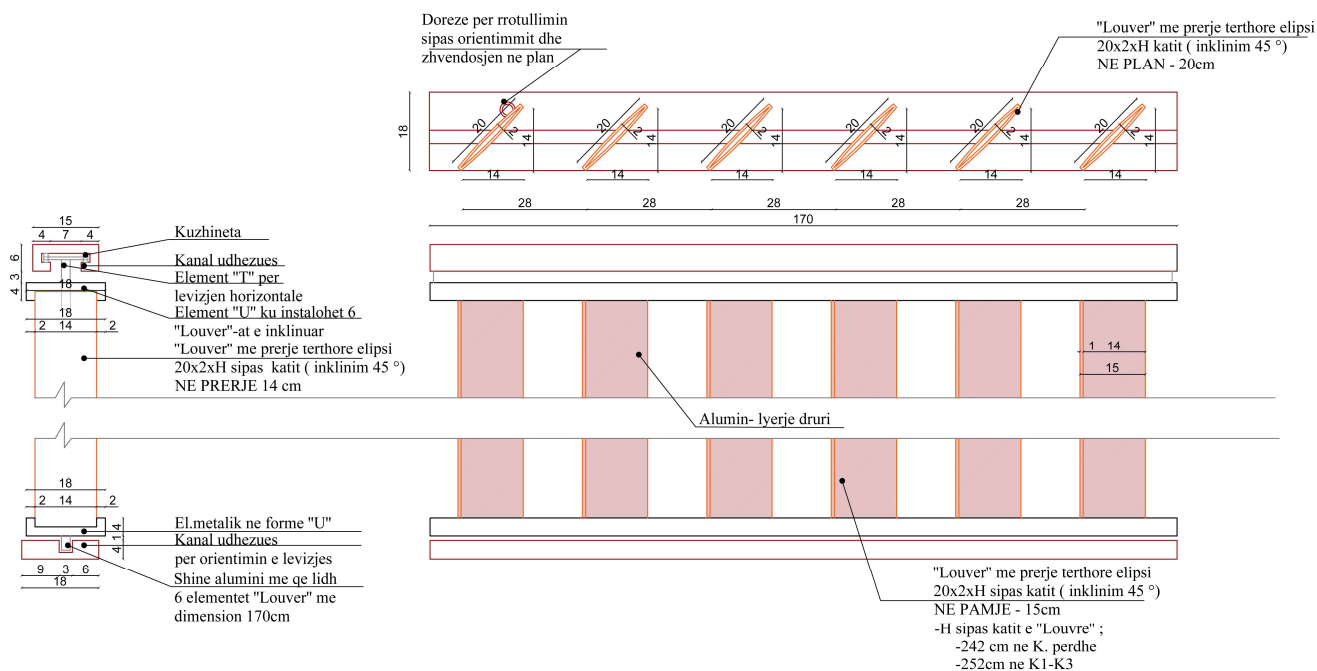
A sample of horizontal wall protection with their quality certificate, origin certificate and warranty certificate must be previously submitted to the Supervisor for approval before installation on the object.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **6.7 Alumin Louver Shade for Facades**

In the building will be used vertical aluminum shading for the facades of the organic part of the building.

It is calculated that for the classes where teaching takes place, which in all cases have 2 windows, to each belongs a group of 6 elements "Louvre" which will be moved manually from the inside, and will be fized with an aluminum rail.



The constituent elements will be:

1. Guide channel that is fixed to the upper part of the sole. It is fixed with clamping elements.
2. "T" shaped element equipped with bearings that help movement in the horizontal plane.
  - Deep ball bearings are versatile bearings, self-supporting, with solid outer rings, inner rings and ball and cage assemblies. These products are of simple design, stable in operation and easy to maintain
3. "U" shaped metal element where the "Louvre" is installed, on both sides, the upper and the lower one.
4. "Louvre" is an aluminum element with dimensions 20x2x252 cm on floors K1-K3 and 20x2x242 on K0. Aluminum coating becomes imitation wood color. With cross section, the shape of each element becomes elliptical, with cross section 20x2cm. These elements will be rotatable, in the drawing it has an inclination angle of 45 °, calculated as optimal due to orientation geographical and forms of the object.
5. "U" shaped metal element where "Louvre" is installed at the bottom.
6. The metal element "U" is supported on a 170 cm wide aluminum rail, which connects the 6 elements "Louvre", which will stay fixed.
7. Guiding channel for movement orientation.
8. Handle for horizontal movement, also to rotate the louvres according to the orientation .

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

**Important note: All the finishes material components mentioned in this section such as tiles, wooden floor, marble ,polystyrene, stucco graffiato, doors, windows, handrails, stairs, painted steel or galvanized, steel window protection frames, painting type, etc, must be delivered on the construction site only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## SECTION 7 GROUND WORKS

### 7.1 Roads

#### 7.1.1 Subbase and base

Subbase implies the ground over which the base and the layer of the road will be poured. The base will meet the demands and conditions of the ground works as described in the item(6.3.1). The underbase will be leveled and pressed in a maximal tolerance of +/- 3 cm. The slope (gradient) will be taken into consideration while working with the subbase.

The base is the supporting layer of the road. After the excavation of the ground to a depth of approximately 30 cm (to the level of subbase) it will be filled with 0/32 mm up to 0/56 mm gravel material. This material will be placed into well pressed layers. The gradient of at least 1% will be retained even during the laying of the base.

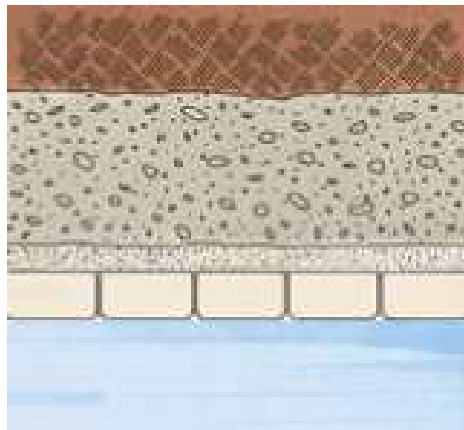
**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.1.2 Laying (flooring)

It is preferred that the flooring of passage ways within the courtyard of the school be made of stone tiles and concrete or solid concrete. This will be done in the following manner:

A maximal 5 cm thick sand layer, of a granularity of 2/5 mm to 0/4 mm to be poured on the base over which the stone or concrete tiles are to be placed. A special vibrating machine to be used afterwards to acquire a perfect leveling. Finally the space between the tiles to be filled with 0/1 mm fine sand so as the tiles be best linked with each other and reinforced /stabilise the layer of these stone or concrete tiles.

Layers of a passageway of this type are shown in the following picture.



**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.1.3 Sewage and drainage

In the case of the application of the above system of passage way (stone and concrete tiles) the needs for planning of sewage and drainage are minimal. The stone and concrete tiles with the system of gutters are not in need of any sewage or drainage because the rain will infiltrate into

the gutters. In case of very heavy rain the passageways will be placed at a gradient of 1%. The gradient is performed from one side to the other side of the passage.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.1.4 Road Signs and Tables (Sign Plates)

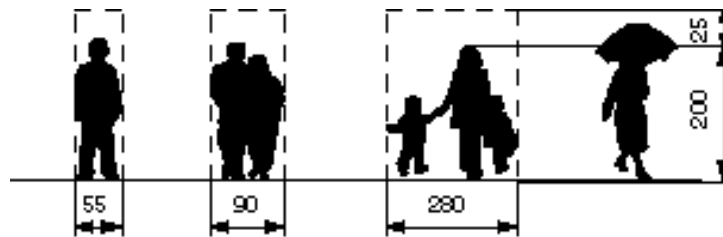
All the structures of the Road signs and necessary directional panels (Sign Plates) should be installed in a way that they be resistant against the stress caused by the wind or other stress. (i.e. against the weight of the children hanging over them)

They must be installed on metal posts placed on foundation holes with minimal dimensions of 30 x 30 x 40 cm and properly filled with concrete.

Signs or directional panels installed on the metal post must be at a minimal height of 2,25 m from the surface.

Road/ Signs plates to be installed will depend upon the need and traffic regulations and the architect will have to decide accordingly.

Route dimensions in cm to be foreseen are shown in the following picture.



**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.2. Parkings

##### General

The number of parking places must be foreseen in accordance with the existing needs of the object/project. That will be decided by the architect/supervisor during the designing phase. The number of parking places at schools depends mainly on the number of teachers and their motorizing degree. If there is no sufficient space for parking places, they should not be projected in spaces of other infrastructure. (i.e. roads, parks, landscapes etc.).

##### 7.2.1 Subbase and base

The subbase implies the ground over which the base and the paving (flooring) of the road will be laid. The base shall meet the requirements of ground works as described in item 6(3.1). The subbase must be leveled and pressed at a minimal tolerance of +/- 3 cm. The gradient should be taken into account while working on the subbase.

The base is the supporting base of the road. It must be processed in the following manner:

After the excavation of the ground to a depth of approximately 30 cm (to the level of subbase) it will be filled with 0/32 mm up to 0/56 mm gravel material. This material will be placed into properly pressed layers. The gradient of at least 1% will be kept even during the laying of the base.

#### 7.2.2 Paving (flooring)

Paving of the parking sites is made of with the same material as the paving of roads (as described in point 7.1.2) of monolithic concrete or paving asphalt. The necessary technical demands as recommended by the projector/supervisor must be observed and fulfilled in cases of other applications in parking pavings.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.2.3 Road Signs and tables

The same as in 7.1.4.

#### 7.2.4 Sidewalk paving

Sidewalk paving can be performed in various manners. In spite of the paving manner, the base and subbase must always meet the necessary technical terms related to the pressing and good material

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.2.5 Cement (concrete) tiles' flooring

Cement tiles flooring is lengthly described in points 7.1.1 - 7.1.4.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.2.6 Plished cement flooring

Excavation of earth on the sidewalks at a minimal depth of 30 cm from the ground surface for a certain planned extension. Installing of a 20 cm thick gravel properly pressed and levelled. Installation of 10 cm thick, M150 cement layer, with technical gutters in every 3 m, performed in thin layers and properly vibrated.

Minimal 2 cm thick layer of cement mortar 2:1 to be perfectly polished and levelled, including scaffolding, propping and any other requirements for the satisfactory completion of work..

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.2.7 Concrete bordures for sidewalks

Sidewalks, roads as well as other asphalt, cement tiles or other material, paved parts are to be protected by side supports. The supporting bordures shall be in accord with the above requirements to support the paved surface from the horizontal forces caused by the motion of vertical forces, cars, people etc.

They have the additional function on conveying the roads waters.

The bordure blocks may be installed at the same height of the paved surface or 10cm to 30 cm higher than the surface of the road as might be required.

The bordures' material is to be of cement or stone. Its selection has to be made by the architect/supervisor together with the client, bearing in consideration that the selected material plays a special role in the surface's decoration.

Materials offered by the marked are of the following type:

- Cement bordure blocks of different dimensions. Those are pre-cast cement pieces (blocks) and should be installed according to the following table:

No.	Bordures in cm (length/thickness/height)	Weight kg/Stk	Need for 1 m
1	dimensions 100/8/20	36	1
	dimensions 1/3 of stone 33/8/ 20	12	3
2	dimensions 100/10/20	46	1
	dimensions 1/3 e gurit 33/10/ 20	15	3
3	dimensions 100/12/20	50	1
	dimensions 1/3 e gurit 33/12/20	17	3
4	dimensions 100/18/20	80	1
	dimensions 1/3 e gurit 33/18/20	26	3
5	dimensions 100/18/25	95	1
	dimensions 1/3 e gurit 33/18/25	31	3
6	dimensions 100/20/15	64	1
	dimensions 1/3 e gurit 33/20/15	21	3

Another type of stone that can be used in the same way as the above mentioned skirtings is that of „cement skirting stone“. Turnings and archs can be realized with them. Two samples of such type are shown in the following table. They can be installed in the same way as the above mentioned cement skirting blocks.



**Stone**

Format 120 x 180 mm  
Hight 600 mm, 1000 mm 1300 mm



**bordure**

**Stone**

Format 120 x 120 mm  
Hight 400 mm

**bordure**

Format 120 x 120 mm

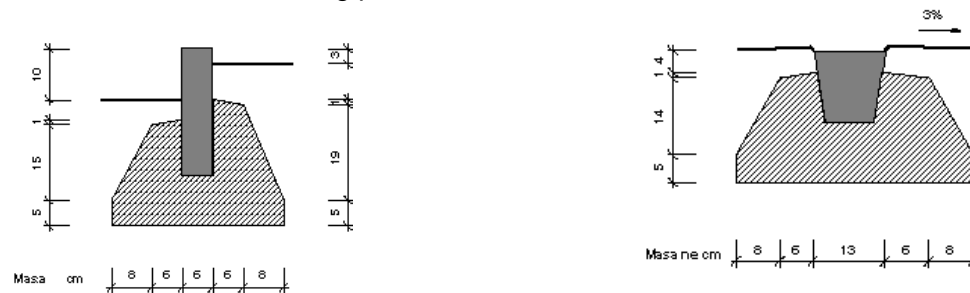
- The same bordures mentioned above can be found in stone according to the granite material. They meet the same functions as the cement bordure blocks. Their dimensions depend on the market offer which is to be inquired for. Usually they have the same dimensions as those of cement.



The installation of bordure blocks is made in the following manner:

The bordure blocks are to be installed before the surface flooring. A channel is to be opened on the ground with the required dimensions. The channel shall be at least 10 cm wider than the blocks, on both sides. The blocks are laid on the half dried cement mortar poured along the channel. Needed concrete is approximately 0,05 m<sup>3</sup>. Cement mortar is poured on both sides so as to properly fix the skirting blocks.

A bordure blocks installation scheme together with an example of a road with a granite stone bordure, are shown in the following picture:



**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### 7.3. Landscape (systemizing of terrain)

#### 7.3.1 Levelling and preparation of terrain (ground)

A special expert, who will make the drawings and give instruction for the works, has to be contacted for the landscape works. It is necessary however that we have under consideration some requirements.

The levelling and preparation of the ground according to need form and budget. If only for decorative purpose it may be left in its existing form. Whatever the levelling of the ground it should be prepared in such a manner as to guarantee the protection of the landscape. In case of lack of good soil (humus), such humus is to be brought from another place and to be laid in a minimal 20 cm thick layer or according to the drawing.

In case of an abundant stone terrain a thicker layer of humus might be needed.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.3.2 Planting and fertilizing

An agriculture expert should be consulted for planting and maintaining the landscape. Due space for the normal raising of planted trees and grass, in accordance with their type, should be left. While planting trees it has to be envisaged that they should not obscure or harm the view of

the building during the breeding process. Special attention should be shown to the places under the shadow of the trees.

The ground grass shall be selected in accordance with its use and step on. It must satisfy the requirements of the environment.

Landscape maintenance and care is of major importance. It should be regularly watered, trimmed etc.

A landscape classification, falling under 4 categories in accordance with its use, as well as the watering and fertilizing criteria are shown in the following table.

Use/type	Ground and maintenance requirements			
	Place /location	Watering/trimming	Physical interference	Fertilization
exhaustion/ step-on few human step-on	Exiting land	No irrigation Trimming to 3-8 cm, 2-6 seasonal trimmings	Not needed	Not needed or light fertilization
exhaustion/ step-on medium ball games	Fertilised or existing land with sufficient features	Necessary irrigation, Trimming to 3-5 cm, Grass grow height 6cm – 8cm..	Sand leveling whenever necessary	2-3 times in season. Total 15-20 g N per m <sup>2</sup> .
exhaustion/ step-on medium-strong(heavy) sporting places etc.	Natural lighting from the sun, fertilized land, drainage in accordance with the existing land infiltration .	Necessary irrigation, trimming to 4 cm grass height/grow up to 8cm.	Sand leveling whenever necessary ventilation.	3-4 times in season Total 18-25g N per m <sup>2</sup> .
exhaustion/ step on very strong(heavy) stadiums (etc).	Natural lighting from the sun. Supporting grass layer must have 40-50% pores (holes), 1.45-1.55 kg/dm <sup>3</sup>	Necessary irrigation, trimming to 4 cm grass height/grow up to 8cm.	Verticilation occasional sand throwing, according to (need).	3-5 times in season, Total 22-32 g N per m <sup>2</sup> .

Leveling shall include the following process: the grass to be cut with a special machinery with revolving knives, to a 1-3 cm thick layer, at short intervals of 2-3 cm. Verticulation is recommended at the start of grass grow(March/April) following the cutting of the grass. This process removes the grown grass lump and prevents water infiltration.

Ventilation: the introduction of oxygen by means to the roots of the grass.

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### 7.3.3 Irrigation (watering) system

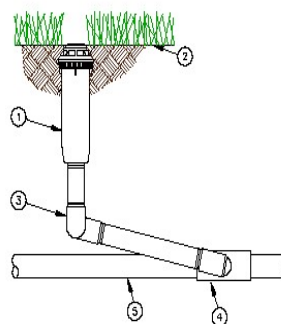
Irrigation plays a major role in the maintenance of the landscape. It should be done according to need, in due time and sufficient quantity 15 – 25 l/m<sup>2</sup> of water should be used for every irrigation so as to reach the roots of the grass .

An automatic irrigation system is recommended. In cases when such a system is not possible, simple (common) irrigation is applied. The automatic system outweighs the common hand system. If such system is connected with one or more sensors, it works automatically and irrigation is performed according to the ground need. Water is saved in such a case and better irrigation is acquired. Besides that, water-throwing devices rise above the ground surface. Systems of such type are frequently applied in European countries. The mounting of these automatic systems is very simple and can be easily performed without any special knowledge. The drawing (design) of the system elements should be done by the expert. The producers of these systems offer free-of-charge mounting schemes in case the systems are purchased to their companies. Very often design schemes and softwares are delivered together with the purchase systems.

Some types of “water-throwers” are shown in the following table. The designer should select the necessary type for his drawing.

Model	Max.pressure (bar)	Water-throw radius (m)	Water consumption (m <sup>3</sup> /h)
<b>PK50-AP</b>	3,6 - 7,8	12,5 - 14,3	0,82 - 1,77
<b>PK60-AP</b>	3,6 - 7,8	13,4 - 15,5	1,52 - 3,13
<b>PK70-AP</b>	3,5 - 6,2	16,2 - 19,2	2,39 - 4,72
<b>PK50-AF</b>	3,6 - 7,8	12,5 - 14,3	0,82 - 1,77
<b>PK60-AF</b>	3,6 - 7,8	13,4 - 15,5	1,52 - 3,13
<b>PK70-AF</b>	3,5 - 6,2	16,2 - 19,2	2,39 - 4,72
<b>PK80-AF</b>	3,5 - 6,2	17,3 - 22,4	5,00 - 9,24
<b>K90-P</b>	4,2 - 6,9	25,9 - 30,8	8,4 - 17,78
<b>K90-F</b>	4,2 - 6,9	25,9 - 30,8	8,4 - 17,78

Some details of a presented such system are shown in the following picture:



Where: Number 1 is the vertical part of the equipment  
Number 2 is the round level  
Number 3 is the joint-angle of the vertical part with the horizontal one.  
Number 4 is a Tpiece.  
Number 5 is a polyethylene

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **7.4. Fencing and Gate**

##### **7.4.1 Fencing in masonry and steel**

The fence is composed by three elements:

The Wall:

Foundation section excavation to a depth of 60 cm from the existing ground level, in terrain of whatever nature and compactness or degree of saturation, wet or dried, including the cutting and removing of roots, stumps, rocks and materials with a volume not extending 0.3 m<sup>3</sup>, consolidation of the foundations, etc. Filling by hand with the same material after the execution of the consolidation of the foundations including the location of the resulting material within the worksite. the foundation wall may be executed in concrete, in concrete blocks or stones (butobeton) including formwork, tothing, propping and all requirements to complete the work in a first class manner.

The fence wall shall be 60 cm high from the ground or road surface. the height of fenceless walls goes up to 1.8 while that of fenced ones, up to 87 cm.

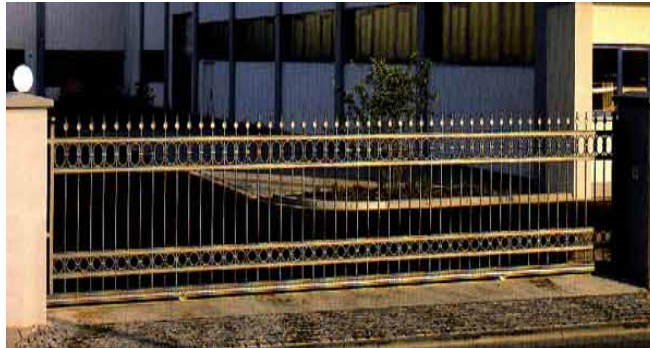
Columns:

Metallic columns shall be placed at a maximal distance of 3 m to the dimensions of the walls' width. Covers with the dimensions of the columns shall be welded on top of them. Columns shall be properly anchored on the previously built wall. Concrete columns or of the same material as the walls can be used in place of the metallic columns. For a proper steadiness they must be of the same thickness with the wall there are placed on, and of a minimal width of 30 cm, In cases when columns are made of stone, concrete or other material, they shall be plastered with a layer of 2 cm m-25 standard mortar. The abovementioned wall shall be plastered in the same way as the columns.

Railing

Railings shall be made of metal (steel) and properly welded/melded with the columns. They shall be painted at least twice with anti corrosion paint. The form and appearance of the railings shall be settled by the architect/engineer and the client. The space between the rails shall not exceed 12 cm, so as to prevent people passing through them.

The minimal fence height (wall+fencing) must be 1.8 m. An example of such a fencing is shown in the following picture.



**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### **7.4.2 Metallic Gate**

Two doors or metallic gate shall be installed. One must fulfill the requirements for car passage while the other requirements for people passage.

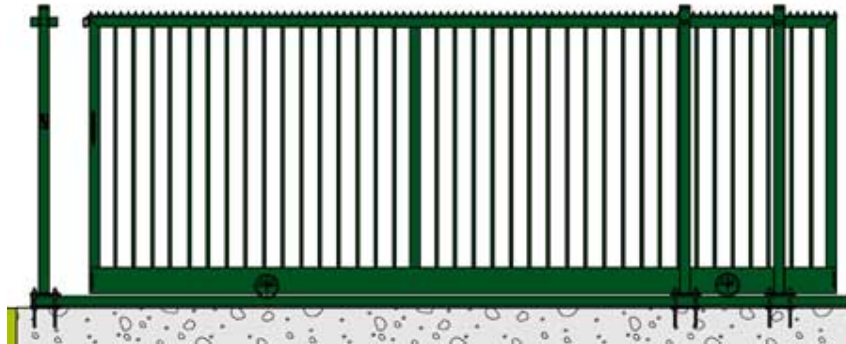
The external gate is to be executed in the following manner:

Providing and installation of a hand operated and gliding metallic gate, in metallic frame and metallic profiles of 50x50 mm, supported at the ends with a metal profile 200x50 mm, posed at the main entrance.

The second frame shall be composed of 16 mm dm of steel installed and welded according to the drawing. Two small steel wheels will be fixed to the lower part, for the sliding of the gate with L profiles fixed on the same concrete base where the two metallic columns holding all the structure of the gliding gate, are fixed.

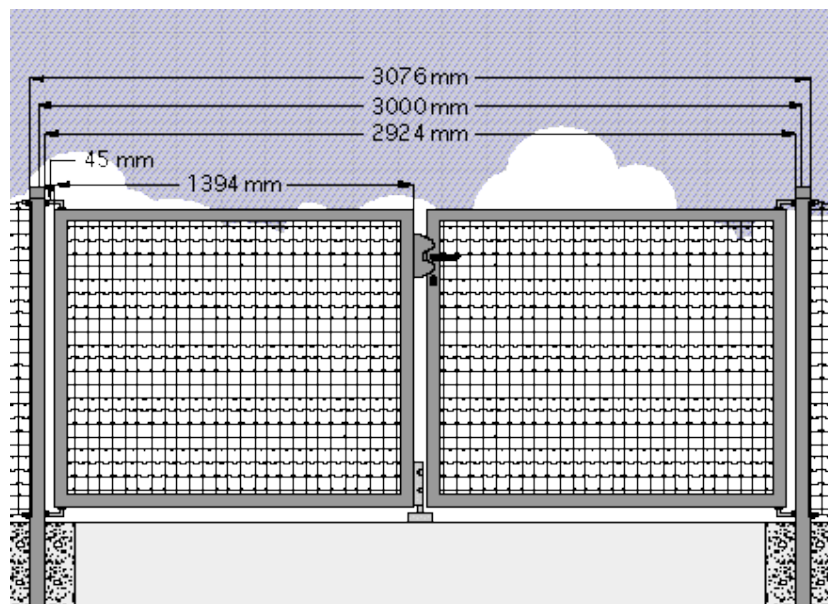
The concrete base (footing) on which the gate will be installed will be depend on its weight, but it shall, at least, have the following dimensions: a minimal depth of 40 cm and a minimal width of 40cm. The engeneer will decide upon the foundation depth depending on the door dimensions and the weight is hoing to bear.

The door shall be equiped with a safety lock, three copies of keys, steady metallic handle and all the other special items for the closing of the door as well as other accessories and any other item to consider it best accomplished and operational.



The passengers' door shall meet the above requirements. It is recommended however that this door be like in the following picture. The dimensions of the door shall be decided by the architect/engineer together with the client. The following gate system is produced by the „Beakaert“ Company.

Some details of this gate are shown in the following picture.





**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

## **7.5. Sports grounds**

### **7.5.1 Hard (solid) grounds (concrete, asphalt)**

Hard (solid) grounds are called those paved with a hard layer concrete, asphalt or any other partially hard material such as tartan. It is recommended that such grounds be applied only to those sports that cannot be performed in otherwise paved ground (i.e. out of doors basket-ball etc)

The damage risk in such ground is much more greater than in other softer layer grounds. Such a fact must be taken into consideration during this process, especially in cases of schools and children. During the design decision shall be made upon whether to install a complex (combined) sport utility allowing the performance of different sports, or single sport ground. The sports ground shall meet the following retirements/demands:

Have a North – South orientation as a guarantee that sportists /students will not be bothered by the sunrays during exercise.

Have a 0.8% - 1.2% minimal – maximal slope (gradient)

The slope, according to the dimensions, to be designed in roof-form, for the water to run from the center to the sides. If the width is smaller than 45 m, than the ground gradient can be performed with one side only.

To construct solid sports grounds the following conditions/criteria should be met:

Sub base is to be properly leveled and presses according to standards/norms. A maximal surface gradient of 10 mm for a distance of 4 m is allowed.

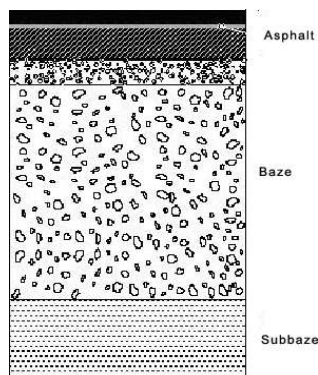
The base of the sports grounds shall meet the recognized demands in the road and park design. The base shall have a minimal thick layer 25 cm, of a properly pressed frost resistant material. A maximal surface gradient of 15 mm for a distance of 4 m is allowed.

It is of importance to design and measure the drainage of the group in case it is covered with a water permeable layer. In cases when an impermeable layer is applied, the water shall be arranged to run into special channels or be absorbed by the soil around the ground.

The concrete or asphalt surface shall be surrounded by borders, resting be on the same base with the ground (terrain).

The last concrete layer shall not be less than 40 mm thick whereas that of the asphalt layer shall not be less than 60 mm thick.

A sketch of the applied layers is shown in the following picture:





**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

### **7.5.2 Soft grounds (terrains) (grass, sand, etc..)**

Soft grounds are those paved with a soft layer of grass, sand or any other similar material. Keto terrenë rekomandohet të përdoren për ata lloj sportesh, të cilat nuk mundet të ushtrohen në terren me shtresë tjetër.

Children injury risk in such grounds is smaller than in hard surface grounds.

#### **Base and subbase**

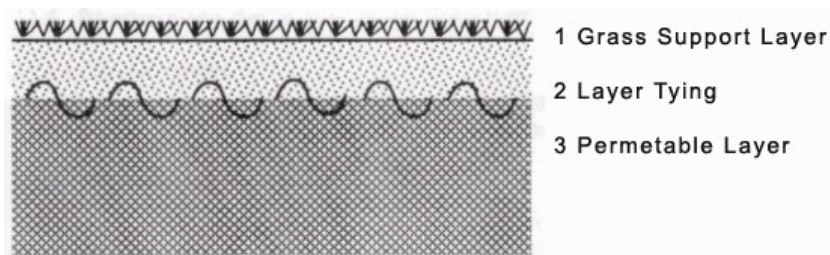
The base layer shall be of a homogenous material all over the ground. The heterogeneous (with different permeability) shall be processed and homogenized.

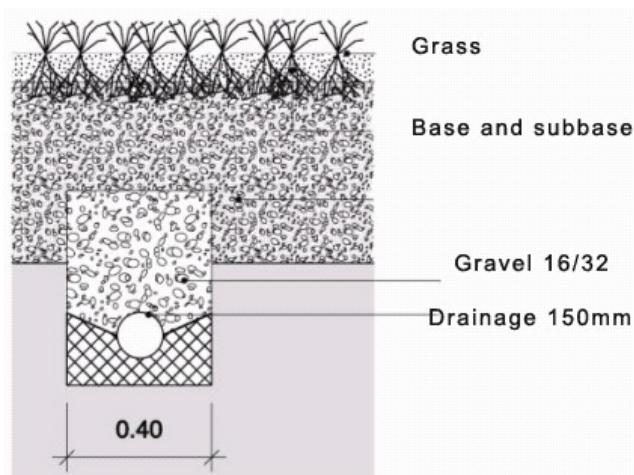
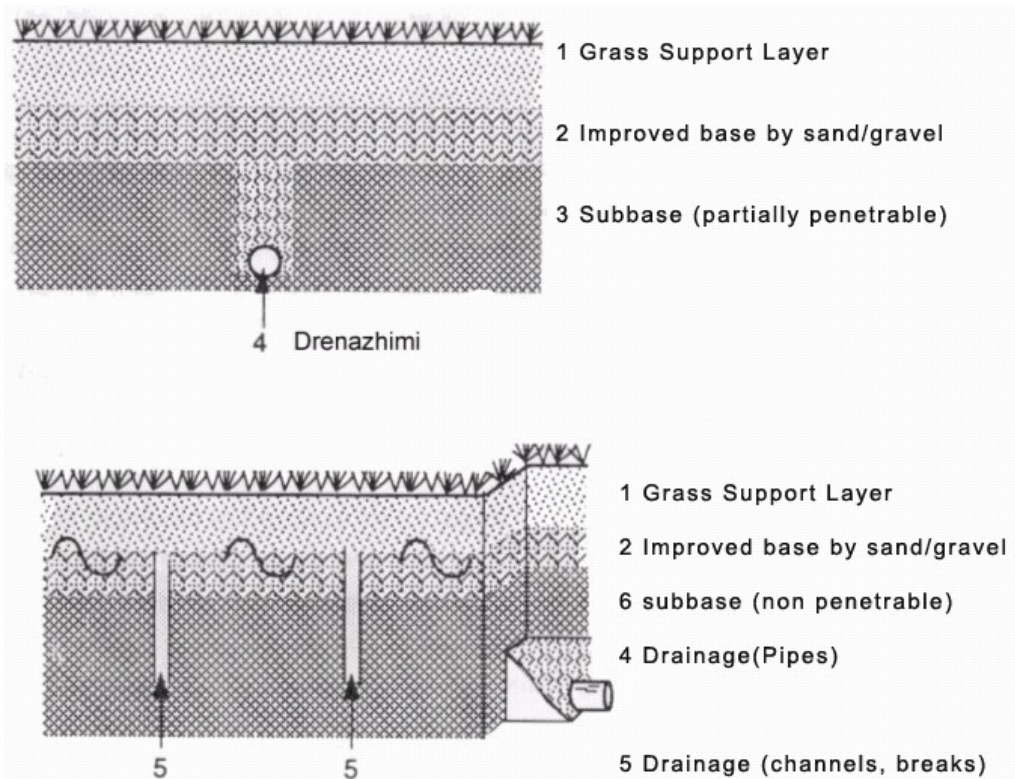
The underground water level during the last 10 years shall not be higher than 60 cm from the surface of the ground. In cases when such a requirement is not fulfilled drainage measures shall be taken to satisfy such requirement. The subbase slope shall be 0,8 – 1,2 %. In cases when the ground is larger than 45 x 90 m the subbase shall be of a roof form with a slope of 0,8 – 1,2%.

The leveling shall meet the following requirements: Holes bigger than 3 cm shall not be allowed on the ground checked by 4 m leveling beam. In cases when the ground is composed of organic materials and there is risk of deformations necessary measures shall be taken for a better examination and prevention of ground deformation.

The subbase water permeability plays a major role. Layers type shall be determined accordingly.

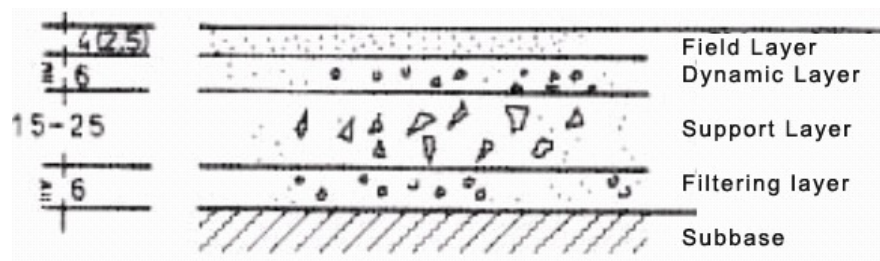
Layer composition systems are shown in the following picture.





The ground construction systems shall depend on the base's permeability. One of the systems shown in the pictures above shall be selected accordingly.

A mineral granularity ground is shown below. This system is applied (laid) only with mineral granularity and water to stabilize and press it. The base and subbase shall meet the same requirements as in the case of grass-layers.



Some works of the ground drainag are shown in the above picture. Drainage plays a very important role during the design of the sports grounds, especially in soft terrains..

Drainage is accomplished in two manners:

1. A combination of pipes/channels:

For this system the terrain shall be devided in lines according to which channels with dimmensions 20 x 30 cm shall be opened. Drainage pipes are placed on these channels which shall be linked to the main drainage system. The drainage construction norms/standards are respected in these cases. Thw space between the two drainage pipes shall approximately 12 m. Thin channels of about 5 – 8 cm, and 15 cm thick within a distance of 1 m, shall be built along the normal direction (90°),

**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

2. Construction of a drainage layer in accordance with the conteporary norms/stands as shown in the following picture.



### **7.5.3 Plastic material (PVC) paved grounds**

Plastic material (PVC) paved grounds shall be called the grounds covered by a soft layer of PVC material. It is recommended that such systems be applied to the sports grounds because of their low injury risk.

#### **Subbase and base**

The base material, at the upper part, shall be to a minimum of 10 cm and homogenous all over the ground. The heterogeneous grounds (i.e. different permeability) shall be processed and homogenised.

The underground water level during the last 10 years shall not be higher than 60 cm from the surface of the ground. In cases when such a requirement is not fulfilled drainage measures shall be taken to satisfy such requirement. The subbase slope shall be 0,8 – 1,2 %. In cases when the ground is larger than 45 x 90 m the subbase shall be of a roof form with a slope of 0,8 – 1,2%, along all directions.



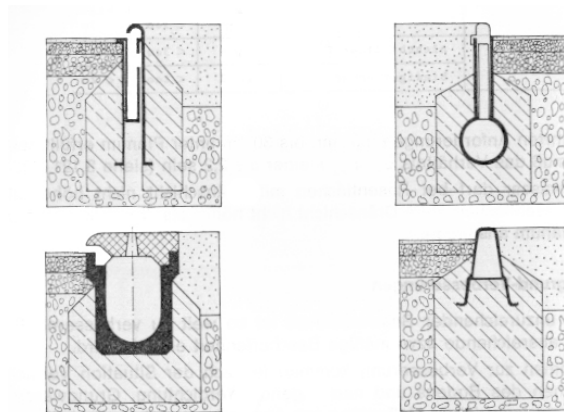
The ground leveling shall meet the following requirements: Holes bigger than 3 cm shall not be allowed on the ground checked by 4 m leveling beam. In cases when the ground is composed of organic materials and there is risk of deformations necessary measures shall be taken for a better examination and prevention of ground deformation.

The subbase water permeability plays a major role. Layers type shall be determined accordingly.

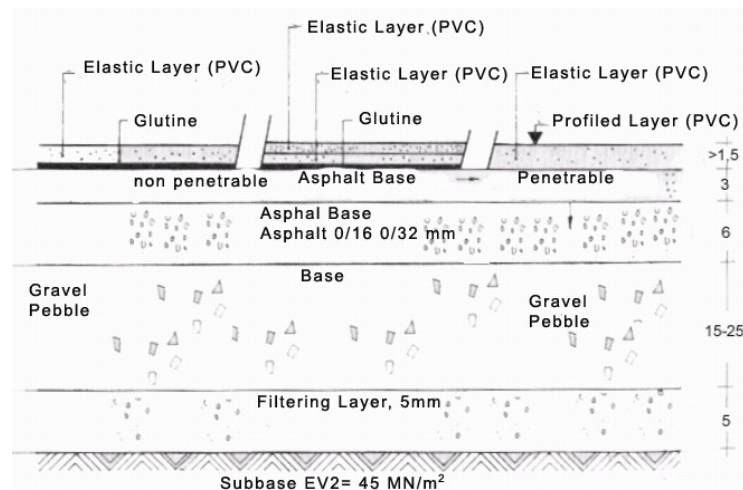
The supporting base of the sports grounds shall meet the recognised demands in road and parking design. The base shall be of a pressed frost resistant material. The base shall have a thickness of at least 25 mm. A maximal difference surface gradient of 15 mm for a distance of 4 m is allowed.

It is of importance to design and measure the drainage of the ground in case it is covered with a water permeable layer. In cases when an impermeable layer is applied, the water shall be arranged to run into special channels or be absorbed by the soil around the ground.

The manner of water collection on the sides of the ground is performed as shown in the following picture.



The construction of PVC paved sports ground is presented in the following picture.



An example of a PVS paved round may be seen in the following picture:.



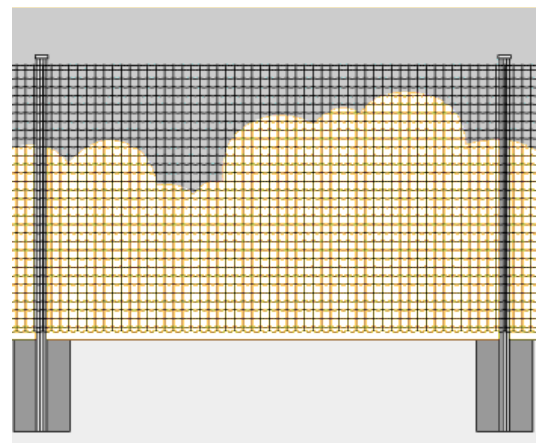
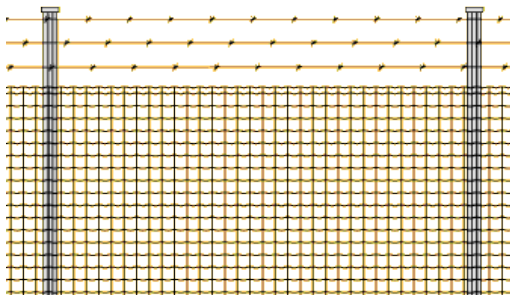
**The proposed materials must be delivered on the construction only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### 7.5.4 Fencing of sports grounds

The sports grounds should be fenced because of the two following reasons:

- To protect the ground against unauthorised use.
- To prevent the ball (or any other sport utility) from escaping the ground area.

a) The protection according to point 1 is realised by a metallic fence to a minimum height of 180 cm. Various types of such system preventing the entrance in the sports grounds can be found in the market. The mounting manner (systems) of such fences is presented in the following pictures. Some rows of barbed wire may be placed if necessary.



„Pantanet“ Fencing system											
Fence hight in mm			Pillars' dimençons								
Total Hight	Hight		Main pillar			Aiding t pillar			Secondary pillar		
	Fence mm	Barbed wire raws	Length mm	mm	Thickness of material mm	Length mm	ø mm	Thickness of material mm	Length mm	ø mm	Thickness of material mm
2100	1830	3	3250	60	2.00	2500	38	1.50	3100	48	1.50
2300	2030	3	3250	60	2.00	2500	38	1.50	3100	48	1.50

b) High fences should be installed in order to prevent the ball or any other sports utility from escaping the ground area. The market offers complete fencing systems even for such cases.

Usually such systems are up to 6 m high, but higher ones could be requested if necessary.

A system of such kind is presented in the following picture



The systems and elements (components) presented above fulfill all the requirements for such kind of fencing. Their installation shall be done according to technical instructions under the control of the architect/supervisor.

**Important note: All the ground works material components mentioned in this section such as fences, metallic gate, path way tiles, sport areas finishes, urban furniture, greenery, etc, technical specification and brochures from the supplier must be delivered on the construction site only after the example has been approved by writing from the supervisor and UNDP Engineer.**



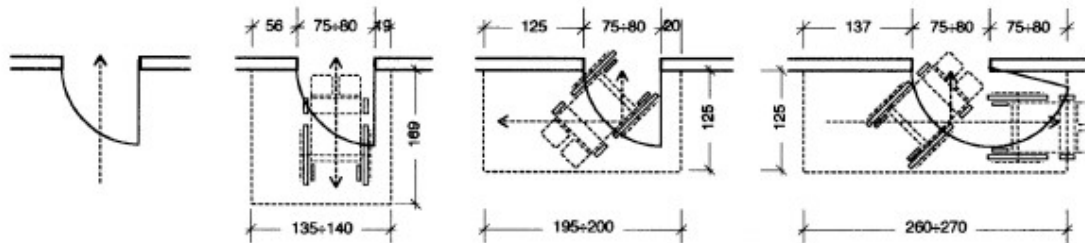
## SECTION 8 SPECIFICATIONS/ NORMS FOR PERSONS WITH DISABILITIES

### • *Environmental units and their components:*

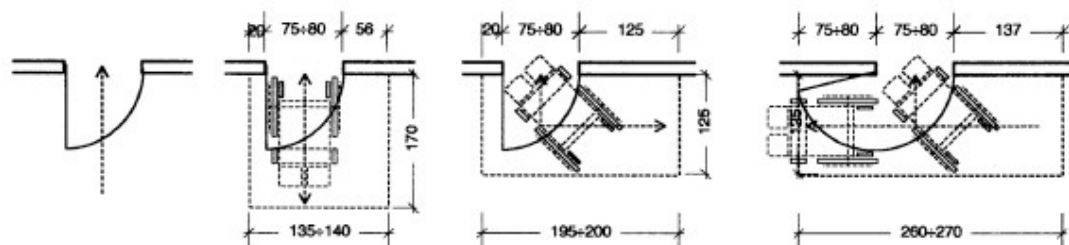
Doors, entrance doors spaces of each building and each estate unit must be at least 80 cm. Doors space must be at least 75 cm. Spaces before and after the door shall be in accordance with the minimum provided graphic data schemes as follows. The height of the glove should be between 85 and 95 cm (90 cm recommended) and for window up 90 ~ 120 cm. Solutions should be given priority with a single shutter doors have width greater than 120 cm and windows are placed at a height of 40 cm from the walking plan. Shoe cleaning elements must be placed at floor level.

Appropriate solutions for persons with disabilities: the spaces before and after the doors

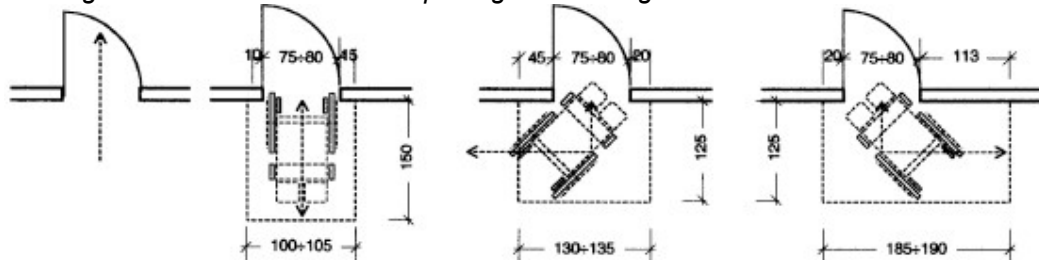
*Turning in the opposite direction to the movement - turning from left*



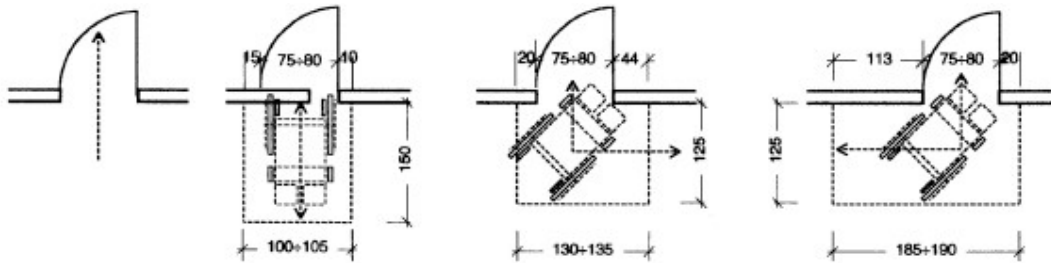
*Turning in the opposite direction to the movement - opening from the right*



*Turning towards the movement - opening from the right*

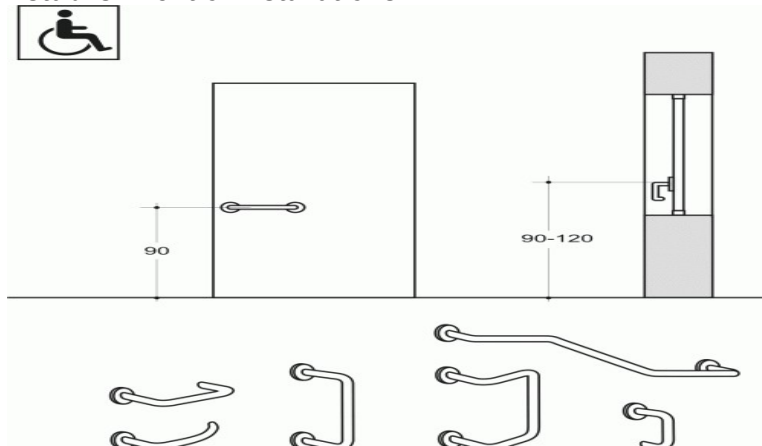


*Turning towards the movement - turning from left*



### Handles on doors and windows.

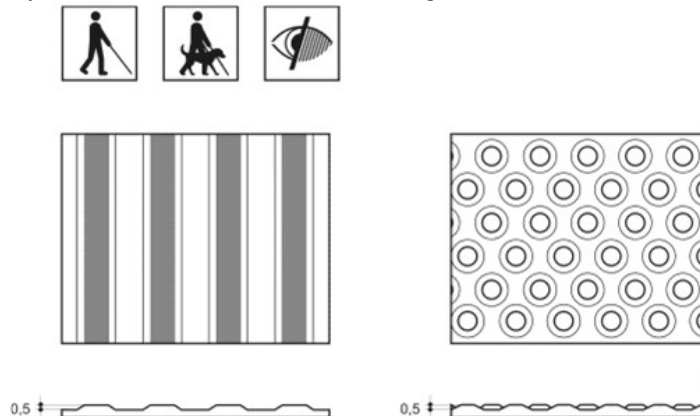
### Establishment of installations.

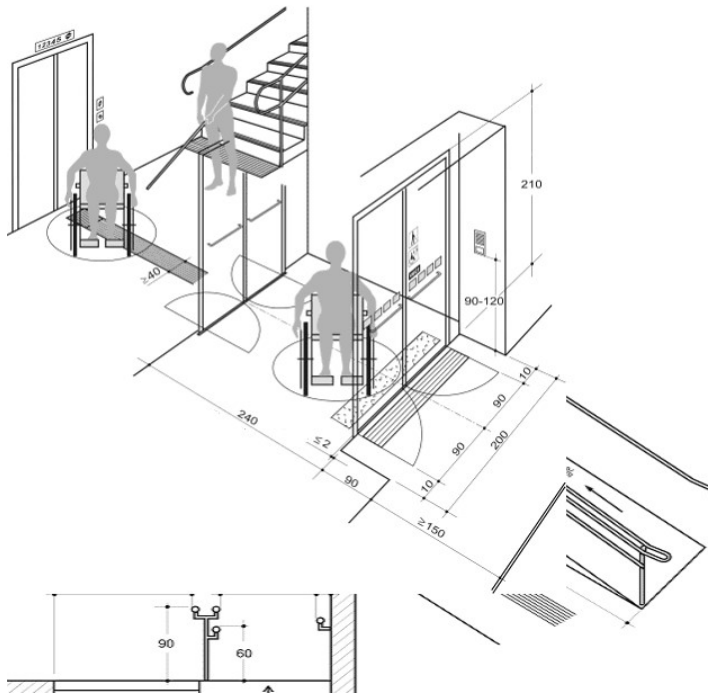


Floors, their possible disparities should not exceed 2.5 cm. Where they are predicting skid road paving.

### Relief surface

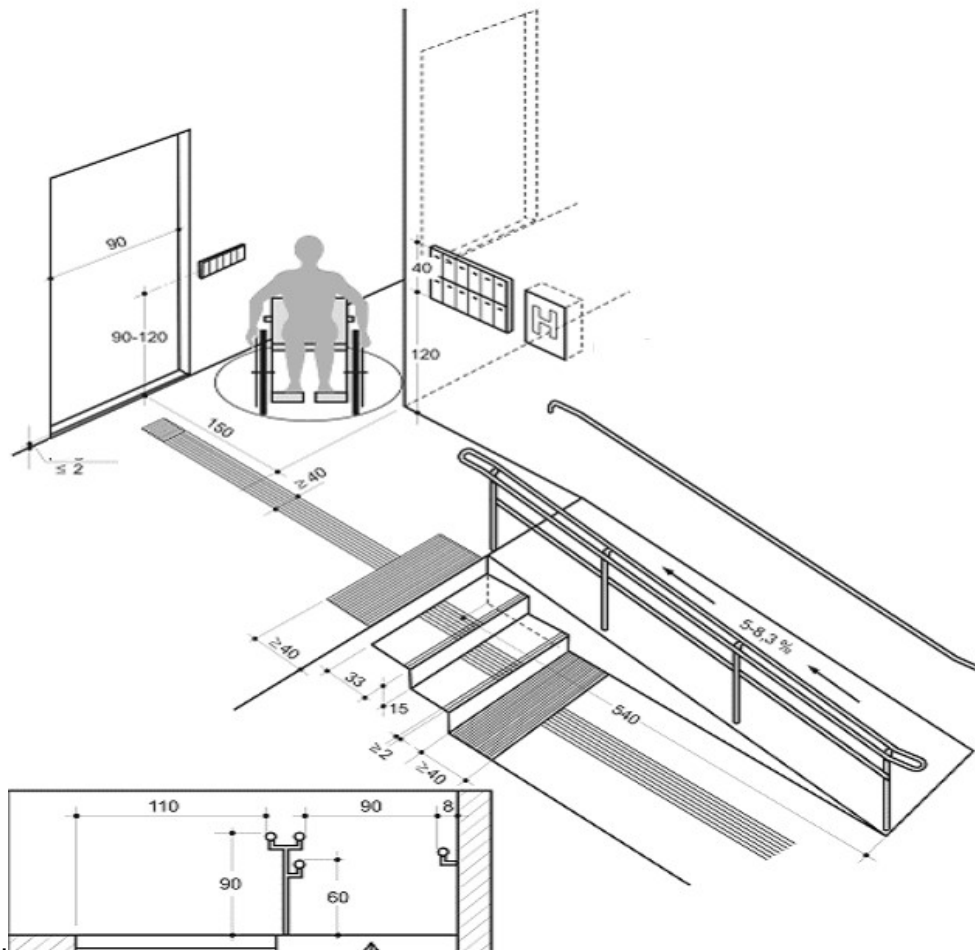
### Depressions structures; Beaded edge structures





- Interphone set height to 120 cm from the floor with light indication;
- Light switches and alarm set in height from 90 to 120 cm from the floor;
- Outlets placed on the kitchen work surface;
- Other outlets located in height from 90 to 120 cm from the floor;
- Electrical framework set in the amount of 90 to 120 cm;
- All electrical equipment installations have color in contrast to the surface where installed.

## Installation Fitting ,thresholds



### **Wheel chair lift**

- 340 kg capacity •Maximum travel of 3,000 mm •Travel speed: up to 0.13 m/s approx.
- 900 x 1,400 mm standard platform dimensions
- 115 VAC operation (115 VAC up direction and 12 VDC battery down)
- Emergency battery lowering •Remote location emergency manual lowering device •2:1 chain hydraulic drive system
- Gear type hydraulic pump •8 foot long modular guide rail assembly •Roller guide shoes •1.5 hp (1.119kW) output
- Electronic free relay logic controller •Automatic battery recharging system (115 VAC)
- Combination mechanical lock and electric contacts or electric strike •Low voltage controls
- Normal limit switch
- Control buttons on platform •Keyed call station •Continuous pressure directional buttons
- 6,067 mm high side guard panels •Non-skid platform surface
- Beige electrostatic powder coat paint on all steel and aluminum surfaces •No machine room required



**Important note: The wheelchair lift technical specification and brochures from the supplier must be delivered on the construction site only after the example has been approved by writing from the supervisor and UNDP Engineer.**

#### • **Hygienic services**

Services should ensure hygienic handling and access for people with motor disabilities, should provide about the maneuvering space, the toilet-side approach here, bidet, bathtub, shower, washing machine and approach the front of the sink. So be respected following minimum dimensions:

- Space required approach and lateral movement of the wheelchair to toilet and bidet shall, if provided, must be minimum 100 cm, measured from the axis of no sanitary isjes
- Space required approximation wheelchair side of bathtubs, must be minimum 140 cm along the tub with a minimum depth of 90 cm;

- Free space for movement in a wheelchair for people with disabilities should be circular area with a diameter of at least 150 cm
- Space required approximation wheelchair front of the sink, must be at least 80 cm measured from the front of the sink. Regarding the characteristics of sanitary equipment among others sinks must have upper located at 80 cm from the floor and without column with siphon possibly half closed or embedded in the wall;
- toilets and type bidetë be dependent, in particular toilet axis or bides should be placed at a minimum distance from the wall 40 cm side, the front should be greater than 65 cm the back wall and the top must be 45-50 cm from the floor. If the axis of the toilet or bides is more than 40 cm away from the wall, it has provided a link or guardrail to allow movement at a distance of 40 cm from the axis of the sanitary device. Equipping the release of water in the toilet be placed at a height of 70 cm above the floor surface;
- Spray should be placed below, equipped with a chair to sit and get up and shower the phone;
- clothes VARs should be placed at a height of 120 cm from the floor;
- All equipment should have pronounced contrast in color from the floor and walls;
- Installation of the door opening mechanism from the outside in case aid award;
- Installation of an alarm system within the bathroom for use by disabled persons in case of need.

In residential dwellings accessible, the data in Article 3 of the second part of this regulation, among others, should be set in steps and railing equipment horizontal and / or vertical near the equipment.

In public places sanitation is required installation of guardrail near toilets, set with a height of 80 cm from the floor and with a diameter equal to 3-4 cm; if it is fixed to the wall should be placed 5 cm away from himself.

In the case of eligibility allowed bideve removal and replacement of the bath with a shower set down, in order to obtain a space for approaching the toilet side States and to determine adequate maneuvering space.

In the apartments of the residential buildings, which is projected at the request of the possibility of exploitation, sanitary service will be called accessible if it would be possible to achieve at least a toilet and a sink you by a person in a wheelchair. With the achievement of sanitary equipment means the opportunity to reach her bedside without side approach to toilets and bringing the front to sink.

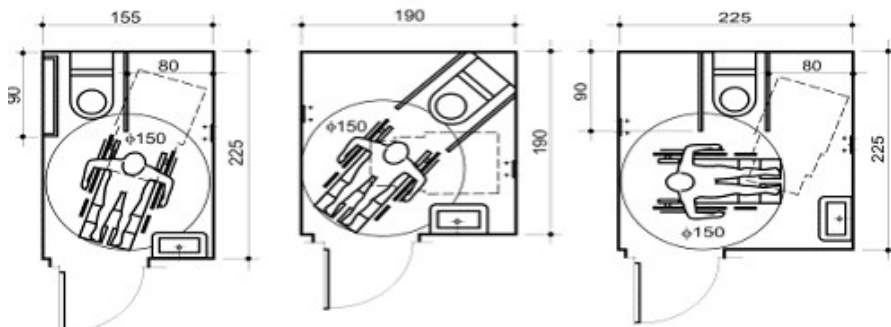
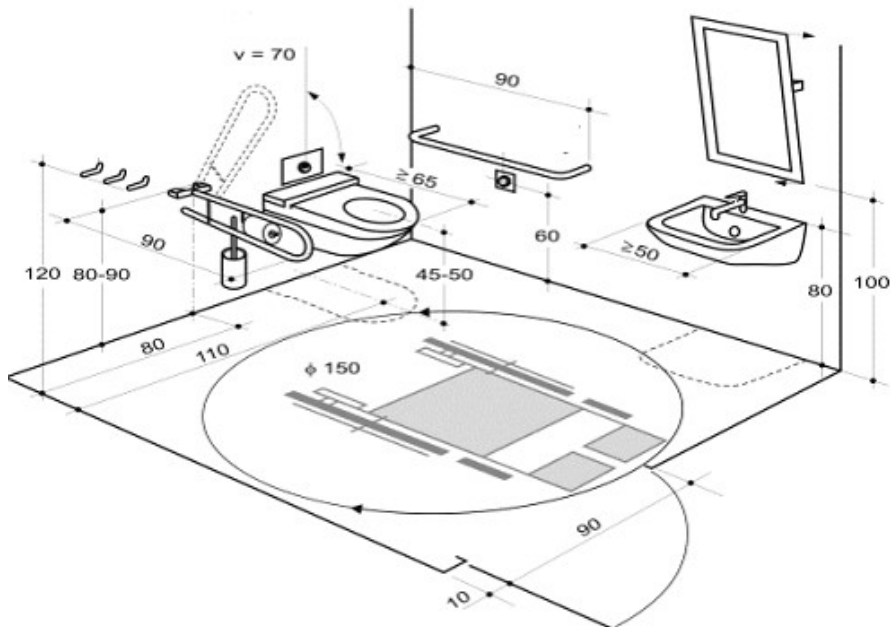
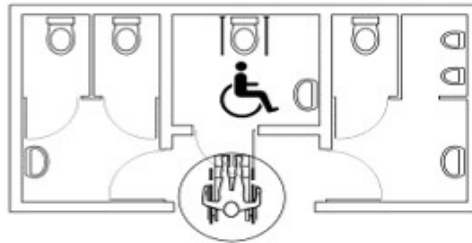
Signs for the possibility of using hygienic service facilities are provided as follows.

## TOILET

*The mechanism for releasing water.*

$v = 70$  cm.

*Installing alarm.*







**Horizontal routes and corridors** must have a minimum width of 100 cm, and appropriate extensions to allow the change of direction of movement by a person in a wheelchair. These extensions must be realized in the terminal parts of the corridors and also provided to realized every 10 m in linear development. For parts or landing corridor where doors open to be adapted technical solutions in accordance with the ways of opening doors and spaces needed for passage, as well as technical solutions:

- The equivalent net goal with 75 ~ 80 cm when:

- a. Passing the gate area on the page wall is perpendicular to the direction of the wheelchair direction for:

- a-1. needs back during the opening movement, the free base required surface is 190 cm and 100 cm width of the corridor.

- A-2. simple maneuver, without moving back side spaces that should be respected is 45 cm and the free surface of the base must be 135 cm.

- A-3. free width 100 cm, free surface of the base must be 120 cm.

- b. Passing the gate area located on a site wall is parallel to the direction of management for wheelchair;

- b-1. Corridor width 100 cm, space needed beyond the gate should be 20 cm, the maneuver space to start on the left should be 100 cm and the opening of the gate more than 90 °. The same goes for the opposite door.

- b-2. Corridor width 100 cm space required beyond the goal should be 110 cm to allow opening and necessary space on the left should be as far as voice instead carts .. The same for the opposite side entrance.

- b-3. Corridor width 100 cm opening of the gate is beyond 90 °, the space required in the corridor beyond the gate is 10 cm, space needed beyond the entrance gate space is 20 cm and the space required on the left, in the hallway at least 90 cm, to guarantee the return.

- c. Thin crossings and through the gates located in straight line between them and the page wall perpendicular to the direction of movement of the wheelchair for:

- c-1. Need movement back during the opening of the gate basic space needed is 190 cm, space needed basis before the hall is 120 cm and 100 cm width of the hall. c-2. Simple maneuver, without having to perform space moves back through the second gate is 45 cm, space needed basis is 180 cm and width required is 135 cm.

- c-3. Need movement back during the opening of the gate width of the hall is 100 cm and the space needed is 190 cm base.

- c-4. Simple maneuver without having to move back empty spaces through the second gate is 45 cm and the necessary space base is 210 cm ..

- c-5. Simple maneuver without having to move back needed space base is 170 cm and space needed basis before the hall is 135 cm.

- d. Walking trails exists located in thin and pass through gates perpendicular among them are:

- d-1. width 100 cm thin and needed beyond the gate areas 20 cm, as well as the necessary space between the two doors 110 cm.

- d-2. Hall width 100 cm, opening the gates to 90 ° and hall space base 140 cm.

Solutions a-1, c-1, c-3 are acceptable only in case of adjustment.

### **Ramps (ramps)**

Considered achievable passage of an elevation of up to 320 cm via ramps placed one after the other.

Ramp must fulfill conditions:

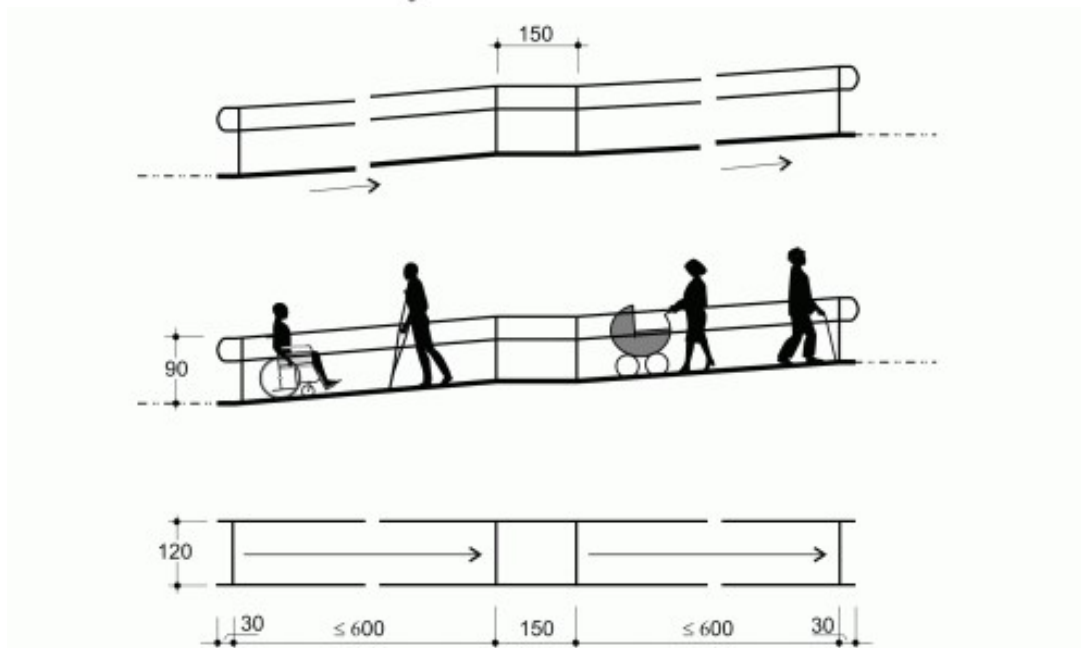
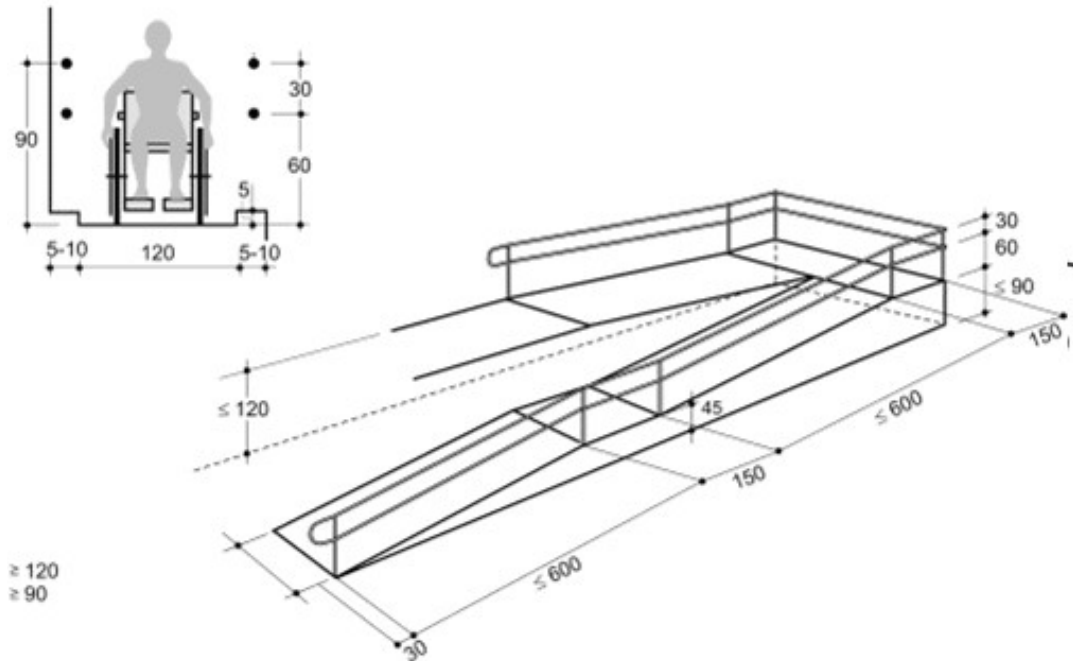
- Slope to allow up to 1:20 (5%);
- Width of at least 120 cm in outdoor spaces, ie less than 90 cm in the interior spaces;
- Horizontal holiday square minimum dimensions of 150 x 150 cm or 140 x 170 cm in terms of indirect and 170 cm in the longitudinal direction from the opposite side of the movement, located in 10 m length of the ramp,
- Relievore against the sliding surface;
- Fencing with gloves built into the unprotected holder or, failing an edging at least 10 cm height;
- Glove holder with 4 cm diameter, formatted so that it can be captured with the span, located in two heights - 60 cm and 90 cm;
- Siege of the ramp which is located in outer space, holding his gloves realized in such a way as not to be susceptible to thermal changes;
- Siege of the glass surface to be visibly;
- Use of signs of adaptation.

The slope of the platforms must not exceed 8%. Are acceptable sloping higher, in the case of eligibility, related to the effective linear development platform.

### **Ramp**

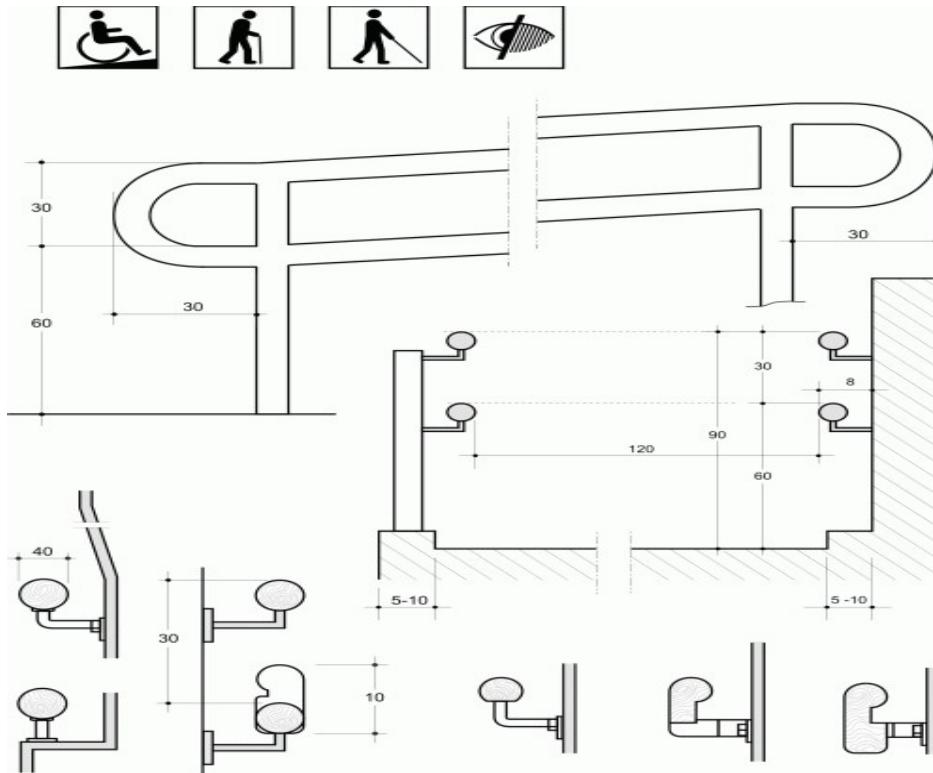
**≥ 120 cm in outer space**

**≥ 90 cm in interior spaces**



## Supporter of hand (koromano)

### circular handles



### Rooms, classrooms and work spaces

Rooms, classrooms and work areas should be free communication space for a wheelchair for the disabled movement, minimum size 150 cm diameter circular, communication space for moving around furniture (furniture) to the width of at least 120 cm; work table made in console form wherein the upper surface distance from the floor to be 85 cm, while the width of at least 70 cm by 50 cm depth approach.

### Stationary equipment

In residential buildings, mail boxes should not be placed at a height more than 140 cm.

In places open to the public, where human contact is made through the tables, it has provided a free appropriate space, preferably in a shared environment, to become a normal expectation, which among other things can be placed a sufficient number of countries to sit (preferably separate seats).

Distance before each table should be at least 150 cm and 120 cm laterally at least over easily order through tables.

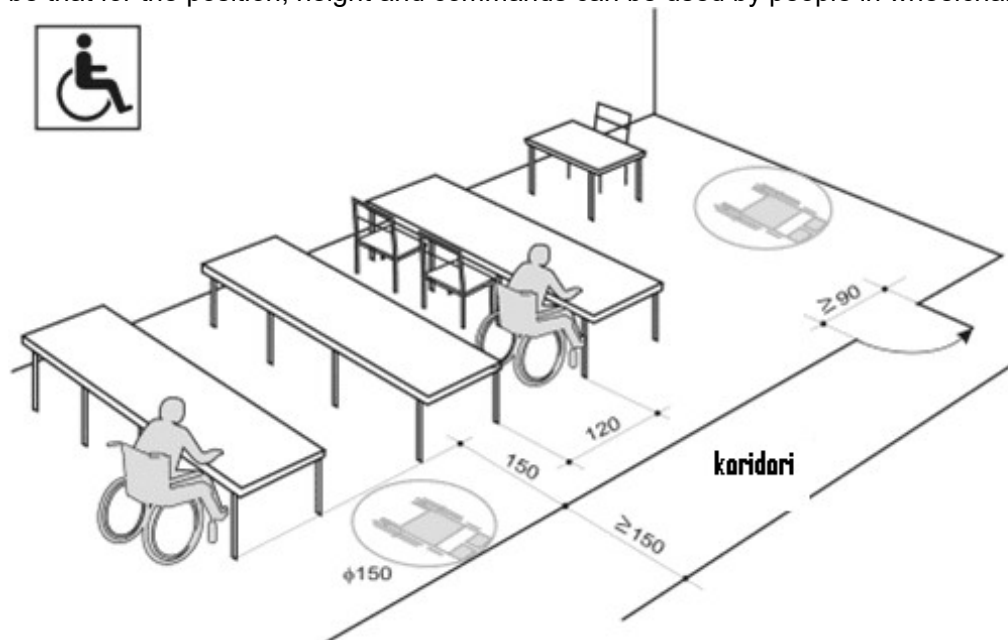
In places open to the public, in which human contact is made through the counter window or in walls extend, facilitate a suitable reception for the public, in order to avoid the appearance of pathological situations of nervousness and fatigue. However, in such countries should create free space, preferably in separate rooms, which can become a normal expectation, in which among other things can set a certain number of places to sit (preferably separate seats) .

Regarding specific flows of people, they should be provided guidance dividing barriers, which should be of a similar length to that of the order of the people and which is considered as the average large flows and with a minimum width of 70 cm. Barrier that separates the path of bringing him exit window should be stopped from a distance of 120 cm at the end of the counter obstacles prolonged or work plan of the window in the wall. In any case the barrier between guiding should not have a length greater than 400 cm. Barrier between guiding must be firmly fixed on the floor and have an elevation in the level of a borders of 90 cm.

At least one window must have the plan of use for persons in wheelchairs, located at a height equal to 90 cm from the ground in the space reserved for the public.

In places open to the public where human contact is made through extended counter, at least some of them should have a plan of use for people, situated at a height equivalent to had 85 cm from the ground.

Automatic equipment of any kind for public use located inside or outside the estate units open to the public, be that for the position, height and commands can be used by people in wheelchairs.



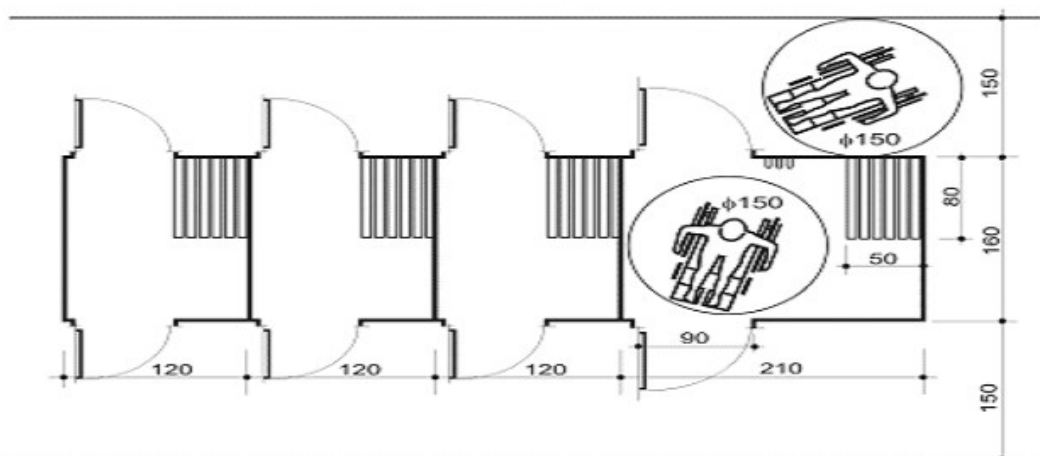
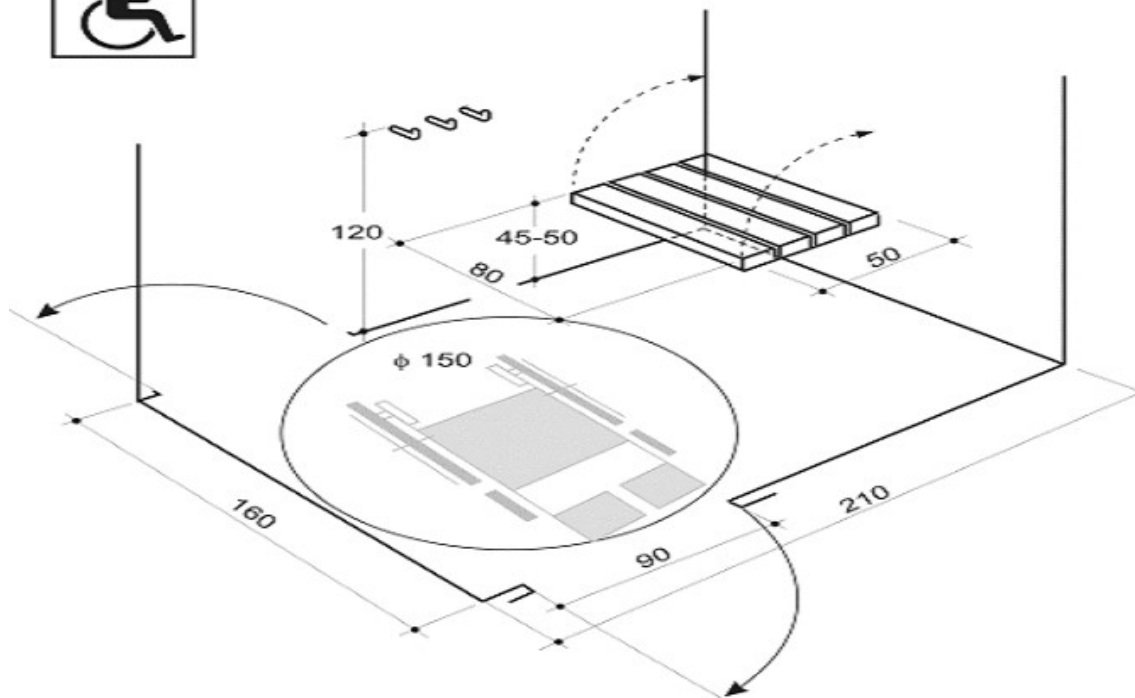
## Wardrobe

Wardrobe must have:

- The dimensions of the base not less than 160 x 210 cm;
- Door with a handle according to the standards of 2.1 of Article 8 of Part II of this regulation, with at least 90 cm space opening out or sliding;
- Hangnail located at height of 120 cm from the floor;
- Folding seats located in height from 45 to 50 cm from the floor;

In the building which is necessary wardrobe 10% of their adjusted realized from the total number, but not less than one.

### Wardrobe.



### Rings.

#### Orientation plan for movement in buildings

Orientation plan for movement in the building must be carried out in the form relieve and satisfy the following conditions:

- Be placed horizontally up to 90 cm height and vertically up to 180 cm height from the quota of the floor.
- To be located near the entrance of the building;
- Contain information in Braille;



- From the front door of the building to have come relieve plan leading to the direction of movement;
- To show the direction to accomplish

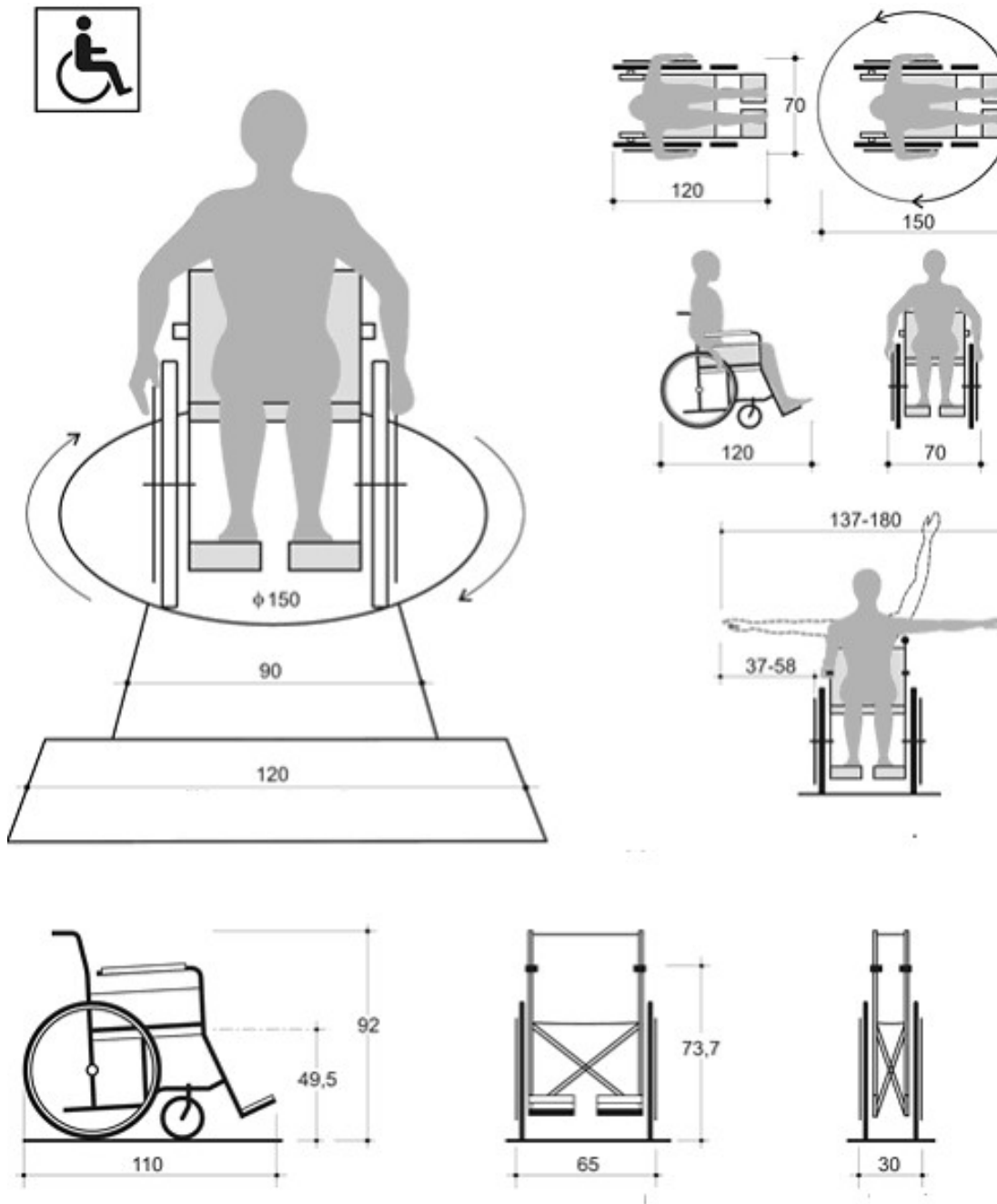
#### Signs of adjustment for people with disabilities-in

The following are signs of adaptation. Dimensions and color of all the signs of achievement, as well as the type of material from which it is determined in relation to work:

- Plan in which a sign;
- The shape of the outer space and / or the interior;
- The distance from which the PWD should notice the sign.



#### Graphic presentation on the conditions of use of auxiliary elements for accessibility Terms of use of assistance in moving the wheelchair spaces for persons with disabilities - PWD



The width of the road movement in closed spaces.  
The width of the road movement in outer space.  
Side view, frontal view, frontal view of the folded wheelchair.

**Dimensions in the wheelchair with the user width.**