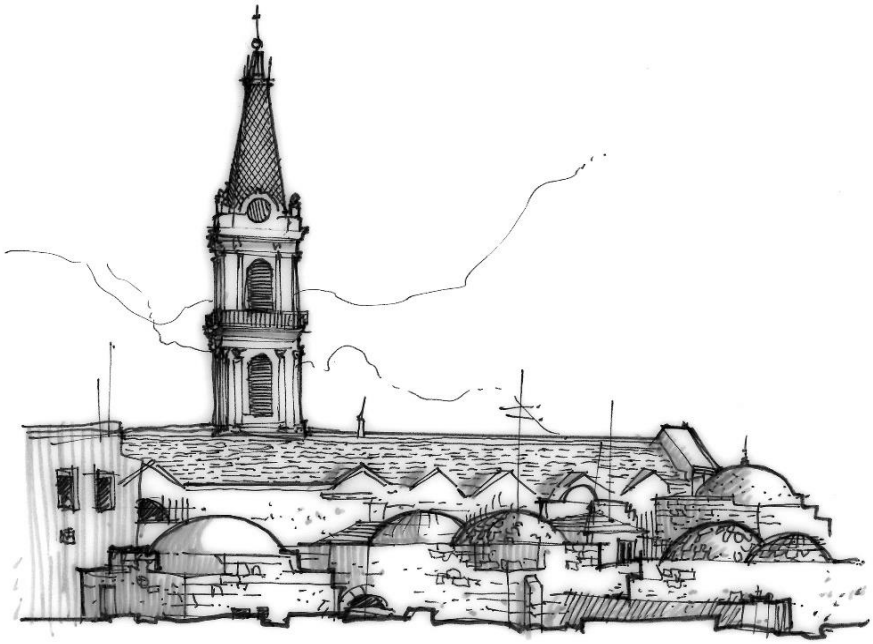
Custodia Tarrae Sanctae

J E R U S A L E M

Terra Sancta Museum

Monastery of Saint Saviour, New Gate Door



Annex 3 - Technical Specifications

"Public Works Contract at the Terra Sancta Museum in the Old City of Jerusalem".

Reference number: PSE22001-10140

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TerraSanctaMuseum

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1 General conditions

1.1 General

TS-1 These specifications are to specify the quality of materials, level of workmanship, and methods to be followed and respected in executing and maintaining the project.

1.2 Drawings and dimensioning

TS-2 The contractor shall be responsible for verifying onsite the list of drawings included in this tender. All costs incurred by the contractor in fulfilling the conditions of this section shall be borne by the contractor and are deemed to be included in the unit rates specified in the Bill of Quantities.

TS-3 The dimensions indicated on the Architect's drawings and in this Technical Specification Document must be verified on site by the contractor at the time of fabrication of the skylight and steel sections.

TS-4 The contractor is responsible for checking all dimensions and availability of sections, if necessary, increasing them to ensure that the work complies with safety standards and regulations.

1.3 Shop drawings

TS-5 Before work begins, the contractor must obtain the Managing Official's and Designer's approval for the manufacture of all works.

TS-6 The contractor shall provide before execution or ordering all workshop, manufacturing, or reservation plans, in coordination with the other trades involved in the superstructures.

TS-7 If during executing the work or before, the Managing Official found that the contractor needs shop drawings to execute a certain task, the contractor must prepare these drawings and submit them to the Managing Official for approval. The Managing Official has the right to instruct the contractor at any time to submit shop drawings, which the Managing Official consider necessary for executing a certain task. The contractor is to abide by this instruction and don't proceed with the task before the Managing Official approves the shop drawings.

TS-8 The shop drawings must be fully detailed with a suitable scale and unless otherwise specified be submitted in electronic format via email to the Worksite Supervisor.

TS-9 The Worksite Supervisor shall within a reasonable time from receiving the shop drawings, review, approve or obtain approval from the designer. If the Worksite Supervisor returns the drawings with notes, the contractor shall adjust the drawings as instructed by the Worksite Supervisor and resubmit to the Worksite Supervisor for approval and he must point out the adjustment made to the first drawing according to the standard procedure.

1.4 Scaffolding

TS-10 The contractor shall provide, erect and maintain the needed scaffoldings to execute the works of this project in accordance with 2 - Scaffolding and lifting equipment, pg 17. Upon completion the contractor shall remove them. The contractor is to take all the necessary safety measures related to these scaffoldings and repair any damages caused by the scaffoldings to the permanent works during the execution period.

1.5 Protection of works

TS-11 See 1.6.13 Organisation of the construction site (Art. 79) of the Tender Specifications document.

1.6 Materials and its equivalent

TS-12 All materials and goods must be according to technical specification. In no instance will environmentally harmful products, such as asbestos, dangerous wood varnishes, etc. be used.

TS-13 The contractor is to submit the specification and description of the materials that he intends to supply with all necessary information to the Managing Official to investigate before supplying. These information include, but are not limited to, trade name, manufacturer address and the contractor is to submit samples if asked by the Managing Official.

TS-14 Wherever a trade name or catalogue number to any material or any item of work in the specification or bills of quantities or drawings, this is necessary to specify the level of specification required. The contractor can suggest alternatives for these materials provided it is with the same level of specification, and to obtain the Managing Officials approval.

TS-15 When an alternative material, other than mentioned in the contract, is approved and it was not in the same level of specification, the Managing Official has the right to refuse deduction to the unit rate of these materials. No increase to the contractor prices should be made if better materials were provided (compared to the required specification).

TS-16 Wherever, in the bills of quantity or specification or drawings, a trade name is mentioned or materials known by its manufacturer company or distributing company or catalogue number, it is to be automatically understood that the required is these materials or equivalent even if the phrase “or equivalent” is not mentioned.

TS-17 All products and materials used by the contractor must be strictly compatible:

- With each other.
- With support.
- And in general, with all materials with which they may come into contact.

TS-18 If the Design Team has prescribed the use of incompatible materials in the tender documents, the contractor must indicate this in support of his offer, and

propose either the replacement of the offending materials, or the products or accessories needed to remedy any problems.

TS-19 The latter will in any case be included in the company's quote.

TS-20 Similarly, while working, the contractor must ensure that no material used by other trades causes chemical or physical damage to his own work. Should this be the case, he must inform the Architect.

- Nature of Materials

TS-21 The nature of the materials used must comply with:

- Fire safety regulations
- Unified Technical Documents
- The specific requirements of the Technical Prescription Document
- The samples systematically submitted to the Architect.
- Approvals granted by the suppliers

TS-22 The materials used must be conform to the samples accepted by the Architect.

TS-23 The use of materials or equipment of a higher quality than that requested, or described in the Technical Specifications Document, will not give rise to any supplement, unless it has been the subject of a written order from the Architect and an amendment.

TS-24 The use of materials of inferior quality will automatically lead to refusal; any replacement resulting from this will be at the expense of the contractor, who will also be responsible for restoring the resulting work.

1.7 Positioning of structures

TS-25 Unless otherwise specified in these Technical Specifications Document, the contractor shall be responsible for the general positioning of its own structures, both in plan and height.

TS-26 This positioning is the responsibility of the present contractor and is carried out at its own expense, the cost being an integral part of the contract.

TS-27 It shall be carried out by a qualified employee from its staff or by a professional surveyor. The level and location of the structures must be strictly adhered to.

TS-28 During the positioning operations, he must check that the dimensions of the project correspond to the findings on the ground, in the work site, the prospect and the level of the external network pipes.

TS-29 If he notices any differences, he must immediately inform the Architect so that the latter can draw the necessary conclusions.

1.8 Samples

TS-30 The contractor must be always ready to submit samples for materials and workmanship according to the Managing Official’s instruction. The Managing

Official shall test and inspect these samples to determine their compliance with the technical specification and contract documents. The contractor shall execute the works according to the accepted samples and following conditions:

1. The cost of all samples shall be borne by the contractor.
2. The contractor is to submit samples before a reasonable time of starting the work to give the Managing Official time to inspect the samples and make the required tests.
3. The samples shall be submitted with a letter containing all the needed information to obtain the Managing Officials approval.
4. The samples shall be kept at the Managing Officials office in the site.

1.9 Materials' testing

TS-31 The Managing Official has the right to ask the contractor to accompany the required materials with a testing certificate from the source either from the manufacturer or a laboratory approved by the Managing Official. See also 1.6.9.2 Preliminary technical acceptance (Art. 41 -42) and 1.6.19.2 Acceptance of the works performed (Art. 64-65 and 91-92) of the tender specifications.

TS-32 The Managing Official has the right to test samples from any material supplied to the site, and whenever needed, either in the lab specified by the Managing Official inside the country or outside. Any materials that don't pass the test shall be rejected.

TS-33 The contractor is to make for the Managing Official and his Worksite Supervisor all necessary assistance and services to test the materials brought to site and taking samples and checking measurements and weighs and provides on his own expenses whatever need from labor, tools, materials, etc.

1.10 Temporary offices and warehouses

TS-34 The contractor must, from the day of the order to start works, rent, bring or build in the site a movable or temporary office for the use of his staff, the supervision staff and the contracting authority when needed. The office shall be in the size suitable for the contractor's needs and requirements and he must obtain the prior approval of the Managing Official on this office and location.

TS-35 The warehouses needed for the contractor use sufficient to store all construction materials needed for the project including equipment and tools. These warehouses must have all the conditions required to protect the materials from the environmental conditions.

TS-36 The contractor shall be responsible to guard and maintain all the above-mentioned temporary constructions that are used by the contractor. He shall also be responsible to provide the required services for these constructions.

TS-37 **The contractor shall bear all the costs of constructing or renting these temporary constructions.**

TS-38 The site office, including the sanitary and the restrooms will be cleaned and disinfected at the expense of the contractor.

1.11 Removing the temporary constructions

TS-39 All temporary constructions for the contractor use shall be kept in all times in a good condition until all stages of works are completed and finally handed over. Afterwards, the contractor shall remove all these constructions and its residuals and cleaning its locations properly so that they leave no trace. If the contractor didn't fulfill this obligation, the Managing Official has the right to execute these tasks on the contractor's account and deduct all the expenses from the contractor's payment and insurance with the Contracting Authority, whatever sum it reach without any legal procedure.

1.12 Temporary and permanent services

TS-40 The contractor shall, at his own expense, redirect public services if exist (like electricity, water, …) which he found during work and according to Managing Official's directions and approval. If existing services is connected to or related to or related to the works, the contractor shall maintain and keep in place until handing over the works.

TS-41 The contractor shall, on his own cost, repair any damages to the public services like telephone, electrical , sewage and water services for the concerned authorities or a third party.

TS-42 If the concerned authority or the third party decided to repair the damages by itself, or asking any of its representatives to do so, the contractor shall born the cost of these repairs don by the concerned authority or the third party. The Contracting Authority, according to the contract conditions, shall not be responsible for any claims for such actions.

1.13 Site meetings

TS-43 During executing the works and on a periodical base, site meetings shall be held every 2 weeks or whenever needed for the purposes to coordinate the works and to be sure that it is properly executed according to contract conditions and technical specification. Minutes of the meetings shall be prepared by the Supervision Team or his representative and distributed to all parties and it shall be followed.

TS-44 The contractor shall present in the meeting detailed of the works intended to be executed in the next two weeks, which shall be discussed and proper instruction shall be given, and these instructions and approval issued in the meeting shall be followed by the contractor.

1.14 Daily reports

TS-45 The contractor shall submit to the Managing Official (or his representative) a daily report containing the required information on the labor (No.s types & hours), equipment and materials arrived to the site and works executed in that day.

1.15 Photographs of progress of works

TS-46 The contractor at his own expense shall submit once a month, or as the Managing Officials find suitable, suitable number of colored photographs for the executed works or works under progress as directed by the Managing Official.

1.16 Handing over works and removing residuals

TS-47 The contractor must hand over all works clean and insure removing all materials or construction residuals or rejected materials or remains in the site in general or in the buildings or nearby. The completion of the works as explained here shall be on the contractor's expense and according to the Managing Official's approval. If the contractor didn't fulfill this obligation, the Managing Official has the right to execute these works on the contractor expense and deduct it from the contractor payments or insurance.

1.17 Measurement of works

TS-48 The Engineering measurement (international measurements) shall be used for all works; all openings and intersection shall be deducted. Actual net distances shall be calculated but not exceeding the measurement reported in the drawings.

1.18 Codes and standards

TS-49 All building materials and equipment should be registered with an international recognized norm institution or correspond to an international recognized norm.

TS-50 The work shall be carried out in accordance with the following documents:

- European norms – Eurocodes
- Unified Technical Documents
- Israeli Standards
- Labor code

TS-51 The above list is not exhaustive, and the contractor is deemed to be familiar with all regulations applicable to the work for which he is responsible.

1.19 Work Tolerances

TS-52 **Positioning of walls:**

TS-53 It shall be rigorous with a tolerance of 0.025 for unfinished work. This tolerance may be combined with the tolerance for coating or finishing work.

TS-54 **Plumbness:**

TS-55 The tolerances allowed for plumbness are as follows:

- Trumeaux, walls to remain unfinished: 0.005
- Trumeaux, walls to be plastered: 0.015
- Straight feet of panels: 0.002 maximum
- Cornices and fascia's must not show differences greater than 0.005 over a length of 10.00 ml.
- Unfinished partitions: 0.01
- For plaster or mortar coats, overhangs will not be tolerated.

TS-56 **Flatness:**

TS-57 The flatness of masonry or plasterwork must be such that a 10.00 m string does not show any flashes greater than 0.025 for ordinary masonry or plasterwork, and 0.005 for masonry that is to remain unfinished.

TS-58 **Edges, angles, and corners:**

TS-59 Edges, corners, and chamfers, whether sharp, rounded, or chamfered, with or without protection, shall be perfectly vertical. In all cases, the verticality of internal and external corners shall be satisfactory to the eye.

TS-60 The angle formed by the intersection of two planes shall always comply with the specifications in the graphic documents (90° in the absence of specifications). These requirements allow no tolerance.

TS-61 **Concrete formwork:**

- Concrete structures shall be delivered with two types of facing as defined in standards:
- Israeli standard 118 (IS 118): Reinforced concrete structures
- IS 4466: Concrete implementation requirements on construction site
- IS 26: General specifications for concrete
- Standard for facing intended to receive a coating or lining.
- Carefully finished for other facing.

TS-62 **The finished surfaces will be delivered with a uniform and homogeneous appearance intended to remain unfinished, with gravel pockets or sandy areas filled in, burrs ground flush with the surface with edges and corners rectified and dressed.**

TS-63 Concrete that is formwork-finished or intended to remain unfinished and prefabricated elements **shall always be delivered with neat finishes.**

TS-64 **The flatness of the facing defined above shall be:**

- Ordinary: 15 mm under a 2.00 m straight edge and 6 mm under a 0.20 m straight edge.
- Neat: 5 mm under a 2.00 m straight edge and 2 mm under a 0.20 m straight edge.

TS-65 The gaps between panels shall always be less than 2 mm.

TS-66 The holes through which the formwork spacers pass shall be filled with SELTEX resin mortar or equivalent (**no earlier than 28 days after concreting**).

1.20 Quality & Origin of Material

TS-67 **Aggregates:**

TS-68 Aggregates (gravel and stones) for reinforced concrete shall be crushed and sourced from approved quarries. They shall comply with the standards and requirements of the Concrete Specifications NF DTU 21 (IS 118 and IS 4466)

TS-69 Sand shall be sourced exclusively from quarries or rivers.

TS-70 It is strictly forbidden to use sand from dunes or from marine extraction.

TS-71 **Hydraulic binders:**

TS-72 The hydraulic binders used for the construction of structures shall be at least CPJ-CEM II class 32.5, in accordance with standards NFP 15.300 to 15.443. (Israeli Standards 896 and 2302)

TS-73 For concrete exposed to aggressive environments, the cement used shall be determined after investigation and study at the project site, in accordance with the guidelines of the concrete engineer

TS-74 **Steel:**

TS-75 Steels for reinforced concrete shall comply with the requirements of BAEL 91:

- Mild fe = 240 Mpa
- HA fe = 500 Mpa
- TS fe = 500 Mpa

1.21 Confection, Implementation & Resistance

TS-76 **Concrete mix design:**

TS-77 The dosages will be proposed by the contractor, considering the base aggregates and hydraulic binders used.

TS-78 The contractor shall submit these mixes with a particle size analysis to the Structural Engineer, which may request any modifications it deems necessary.

TS-79 The dosages will specify the quantities of gravel, sand and binder required to obtain the 28-day strength.

TS-80 The final compositions shall only be determined based on the grain size studies and test specimens that the contractor is required to carry out under the supervision of the Structural Engineer prior to the first application.

TS-81 The dosages given in these Technical Specifications Document are for information purposes only and do not engage the responsibility of the Design Team.

TS-82 **Concrete preparation:**

TS-83 All concrete used must be standard concrete in accordance with standard NP EN 206+A1. Non-standard concrete is strictly prohibited.

TS-84 The characteristics of the concrete to be used will be defined by the Structural Engineer of the contractor (consistency classes, mix ratios, minimum strengths, etc.).

TS-85 The concrete shall come from approved plants chosen by the contractor, under the supervision of the concrete engineer, who shall be free to take any samples he deems necessary.

TS-86 The concrete shall be prepared by mixing. The products obtained shall be perfectly homogeneous and the aggregates shall be perfectly coated with binder; the mixing time being calculated to obtain the desired result.

TS-87 The incorporation of water-repellent products and the use of additives, plasticizers, setting retarders, air entraining agents or other agents may be necessary.

TS-88 If the company plans to use them, it must submit them to the Structural Engineer for approval, along with the conditions of use. These different additives shall not give rise to any additional costs after the contract has been signed.

TS-89 Installation of ordinary and reinforced concrete

TS-90 Concrete shall be carried out by tapping and vibration on the formwork depending on its shape and section, and by vibration for all reinforced concrete structures.

TS-91 The hollow and bubbled parts must be demolished before any further work is carried out and replaced with new concrete of the same quality as that specified.

TS-92 **Steels:**

TS-93 Reinforcement shall be carried out in accordance with the Structural Engineer's instructions.

TS-94 The contractor shall be required to comply with the locations assigned to each steel profile, as well as the Specified overlap lengths.

TS-95 They must ensure that the reinforcements are free of all foreign matter such as earth, wood waste, grease, paint, etc., as well as loose rust.

TS-96 The coverings must be strictly adhered to comply with DTU specifications and the fire stability requirements of the structure.

TS-97 **Concrete resistance:**

TS-98 The resistance of the concrete shall be determined by the reinforced concrete study and specified by the Structural Engineer, depending on the composition of the structure, loads, overloads, and specific constraints.

1.22 Masonry Works

TS-99 Masonry work must comply with IS 2385, IS 2389 and IS 2385: small masonry wall elements.

TS-100

TS-101 The blocks used must be SII certified or similar, naturally dried for at least 28 days, with solid joints; interlocking blocks are not permitted.

TS-102 In order to avoid any confusion between hollow and solid concrete blocks, the lengths of the concrete blocks used shall be exclusively as follows:

- Solid blocks 30 or 40 cm, class B 80
- Hollow blocks 50 cm, class B 40

TS-103 The walls contributing to sound insulation shall always be perfectly joined horizontally and vertically.

1.23 Waste disposal and occupation of road fees

TS-104 The Contractor must include all waste disposal and road use fees in their unit price. All un-reused rubble must be taken to a waste disposal site in accordance with selective sorting regulations.

TS-105 The Contractor shall manually sort and remove rubble from materials (stone walls and masonry) located on the roof, to an approved landfill or treatment center.

TS-106 The work includes:

- Sorting materials at source (inert rubble, wood, metal, etc.).
- Removal of rubble from the roof using appropriate equipment: chute, crane, skip, rubble bags, cherry picker, etc.
- Loading bags into construction trucks or dump trucks.
- Evacuation and transport to approved landfills or sorting centres.
- No temporary storage at the foot of the facade without authorization.
- Limited noise and dust: watering possible, covering of dumpsters.

1.24 Network protection and conservation

TS-107 This article defines the requirements for the protection, and preservation of existing private utility networks during the execution of construction works, to avoid damage and ensure continuity of service

TS-108 Includes all networks located within or near the project perimeter, such as:

- Electrical cables (LV/HV)
- Water and sewage pipelines
- Stormwater drainage

TS-109 Protection measures:

- Networks shall be clearly marked and physically protected (e.g. fencing, signage, protective plates). For overhead networks:
- Height clearance and mechanical protection against materials and tools contact must be ensured.

TS-110 Conservation during work:

- No mechanical equipment shall pass over or near vulnerable networks without a risk assessment. Temporary support or diversion may be required
- No cutting, relocation, or interference is allowed without prior written authorization.

TS-111 Restoration and Handover:

- Any damage to a network must be Immediately reported and Repaired by a certified operator, at the Contractor's

TS-112 expense

- At project completion, all protections must be removed and affected zones restored to their original or better condition.

TS-113 Location.

- For networks next to the work site, see Structural Engineer's plans

1.25 Contractor's obligation

TS-114 The Contractor shall be responsible for setting up and maintaining a site datum level. 'Zero' datum shall be given on the site by the Worksite Supervisor, unless otherwise noted on the Drawings. The level line shall be drawn and maintained by the Contractor. It shall be transfeerred or drawn on each floor as many times as necessary until the end of the work, without the Contractor ebing entitled to claim compensation.

TS-115 As-built plan: In case of modification of any underground network, all underground networks shall be subject to an as-built plan drawn up by the contractor and submitted to the architect at the end of the project. This plan shall indicate the routes of the underground pipes, the water levels of the plugs and manholes, as well as the type, diameter and slope of the pipes and the fluids they carry.

TS-116 Reinforced concrete study: The contractor must comply with the instructions provided by the reinforced concrete design office regarding the sections of reinforced concrete structures and the reinforcement to be incorporated into these structures.

TS-117 About reinforced concrete structures, the price quoted shall be based on the basic assumptions provided by the design office for the structure section, height, and depth.

2 Scaffolding and lifting equipment

2.1 General Prescriptions

TS-118 Information pertaining to the nature of the ground may be given to the contractor, when available, but without any guarantee of correctness or accuracy.

TS-119 All scaffolding installations must be made of new material, and must comply with the regulations governing them, particularly regarding worker safety.

TS-120 All scaffolding installations must be calculated to withstand the overloads, wind and snow loads stipulated by current regulations, as well as the overloads required for assembly and storage of materials, workers' services, etc., and for all trades works.

TS-121 The contractor must take all necessary steps to ensure that scaffolding does not provide easy access to the interior of the building.

TS-122 Unit prices must include all ancillary work required to complete the project, in particular wedges, jacks, moorings, holes and any sealing required, leveling with the resting ground, etc.

2.2 Rentals

TS-123 In addition to the cost of bringing in, erecting, dismantling and returning site installations, protection and scaffolding, the overall price quoted includes the rental of equipment for the duration of the work.

TS-124 Definition of rental: The monthly rental value is intended to cover the cost of depreciation and maintenance, as well as any checks carried out during the work.

TS-125 To avoid any subsequent dispute, the rental period is defined as follows:

TS-126 Departure: Installation fully completed and recorded by service order or registered letter, or in the Worksite Supervisor’s report (palisade, scaffolding, generator, etc.).

TS-127 End: Date of service order or site report prescribing final dismantling.

TS-128 Additional rental costs for site stoppages due to bad weather, vacations, noisy work, are included in the overall fixed price.

2.3 Damage to rented equipment

TS-129 All palisades, scaffolding, etc. must always be of irreproachable quality.

TS-130 The Worksite Supervisor may at any time demand the removal and replacement of any defective or deteriorated elements or have them cleaned at the company's sole expense.

TS-131 The Contracting Authority declines all responsibility towards the company for any deterioration of the equipment rented by the companies responsible for the work of other trades.

2.4 Acceptance of installations

TS-132 Before these installations are made available to other trades, the installer must obtain a certificate of conformity and approval from a competent authority (at the company's expense).

TS-133 The inspection will cover the structure, conception and safety of people and property.

TS-134 A scaffolding installation acceptance report must be supplied to the Worksite Supervisor and the Project Owner, prior to use by the personnel of the companies involved in the present operation.

2.5 Safety and fire security

TS-135 The contractor must familiarize himself with the site's safety conditions and the requirements of the site and its location.

TS-136 Fire-fighting equipment maybe requested to be installed in accordance with the requirements of the city and the Worksite Supervisor. Fire extinguishers shall be maintained in perfect working order.

TS-137 The contractor shall be responsible for supplying, implementing and maintaining any additional common safety devices until the end of the work on the site.

TS-138 All work involving hot spots (welding, cutting, grinding, etc.) must be submitted to the Worksite Supervisor for a fire permit.

2.6 Scaffolding, protection & lift

TS-139 The Contractor shall install multidirectional scaffolding and protection towers to enable the work to be carried out.

TS-140 The work includes decks, firings and protective nets, installed for the duration of all the work.

TS-141 These elements will be carried our in accordance with safety standards and will consider:

- the delivery of materials to the work site (scaffolding),
- preparatory installation work,
- work platforms, necessary protective equipment, guardrails required by safety regulations,
- protective decking to prevent materials and equipment from falling,
- lifting equipment (cranes, cherry pickers, etc.) and handling equipment,
- the installation of a chute for the removal of rubble attached to the scaffolding,
- the installation of a trestle on the scaffolding for the assembly of materials,
- brackets for the installation of winches as requested by the companies,
- maintenance work on various protective structures during the duration of the work.
- removal of scaffolding and restoration of temporary anchor points at the end of the project.

TS-142 Access: The scaffolding must be equipped with a means of access to the various working levels:

- Via a floor with a folding hatch and built-in ladder

- Via construction site stairs located inside or outside the scaffolding and equipped with guardrails.
- Compliance with regulations ensuring the protection of employees requires an additional rail 1.50 m above the floor on the open side.

TS-143 Flooring: the flooring may consist of:

- Prefabricated steel, aluminium, or composite flooring (aluminium frame and plywood).
- Boards resting on at least three joists, with a clear span of less than 1.50 m.
- The slope of the flooring must never exceed 15%.

TS-144 Floors must be wide enough to allow work to be carried out safely and strong enough to support the loads they will bear.

TS-145 The boards must be equipped with a device to prevent them from being accidently lifted by the wind.

TS-146 Anchors: essential to prevent the scaffolding from tipping over, there must be enough of them, and they must be attached to sufficiently strong elements of the façade.

TS-147 The main anchors are:

- Anchors (embedded in sound masonry or sound walls)
- Jacking devices (on masonry or walls that are strong enough to withstand the pressure of the jacks)

TS-148 Quantity required:

- 1 anchor every 24 m² for scaffolding without tarpaulin
- 1 anchor every 12 m² for scaffolding with tarpaulin
- Screw anchors with ring and expansion bolt
- Extendable jacks for standard window frames with quick installation
- Anchor tester

TS-149 Bracing: essential for ensuring the overall stability of the scaffolding

- Longitudinally with diagonal braces to be installed in the same mesh, at a rate of one braced mesh for every 4 empty meshes.
- Horizontally with flat diagonals every 2 scaffolding levels (for tube and clamp scaffolding + boards)

TS-150 Universal type: 8-way disc every 0.50 m on the uprights, allowing diagonal braces and crossbars to be attached to the same node in all cases.

TS-151 Prefabricated floors provide horizontal bracing in place of flat diagonals.

TS-152 Secured by a nailed base plate centered on sufficient support to withstand load deflection without deformation.

TS-153 Protection for assemblers: Hard hat, gloves, and safety shoes

TS-154 In all cases, collective protection (assembly guardrails) should be recommended during assembly rather than individual protection (harness + lifeline)

- Competent personnel who have received appropriate training and are experienced in the specific techniques of assembling and dismantling scaffolding.
- Assembly guardrails: made of aluminium and telescopic adapt to different mesh sizes, in order to effectively protect assemblers.

TS-155 Although designed in consultation and agreement with all parties involved, should any modifications or adaptations prove necessary, these will be carried at the expense of the contractor.

TS-156 All roofing will be protected by an umbrella installed by the contractor for the duration of the work.

TS-157 The contractor will be responsible for all additional scaffolding required for the implementation of his services, with a working floor positioned on the top floor, allowing access to the upper parts of the framework, as well as all protection required for the completion of the works.

TS-158 Location:

- For all the work, from the floor of Room 4 up to and including the roof, as well as on the roof
- For all the work, from the floor of Room 6 up to and including the roof, as well as on the roof
- For all the work, from the floor of Room C up to and including the roof, as well as on the roof

3 Concrete work

3.1 General

TS-159 All materials shall be subject to such tests as the Managing Official may direct and provision for such tests shall be included in the price for such materials inserted in the Bill of Quantities or Schedule of Rates unless otherwise provided for. In case such tests required by the Managing Official, an independent and officially authorized lab shall carry out such tests and sampling.

TS-160 Properly representative samples of all materials to be used in the works shall be submitted by the Contractor for the Managing Official's approval when required.

TS-161 Where tests are required by the Managing Official, the Contractor shall take samples and send to a firm experienced in analysis of the material. Reports shall be submitted to the Managing Official. The Contractor shall bear all expenses consequent to the provision, taking and cartage, etc. of samples, in addition to the costs of performing the tests and reporting the results.

TS-162 The Managing Official reserves the right to reject any material which, in his opinion is objectionable in any respect, not withstanding its apparent compliance with the relevant Standards. Any such rejected material shall be removed from the site at the Contractor's expense at once.

3.2 Concrete

3.2.1 Cement

- Type CEM I or CEM II, conforming to EN 197-1 and recommendations of Structural Engineer

3.2.2 Aggregates

- Clean, hard, well-graded, and conforming to EN 12620
- Maximum aggregates size: typically, 16-20 mm for walls, unless otherwise specified.

3.2.3 Mixing water

- Clean, free of harmful impurities, conforming to EN 1008

3.2.4 Admixtures

- Only approved admixtures (plasticizers, superplasticizers, retarders, etc.) conforming to EN 934-2 are permitted based on concrete performance requirements.

3.2.5 Quality of Concrete

TS-163 As soon as possible after signature of the Contract, the Contractor shall prepare such trial mixes as required to satisfy the Managing Official that the specified concrete strengths will be obtained using the materials and mix proportions in accordance with the above clauses. The proportion of cement shall be increased if necessary to obtain the strengths required.

TS-164 The Contractor when tendering having knowledge of the source and types of cement, aggregate , plant and method of placing he intends to use shall allow for the aggregate/cement ratio and water/cement ratio which he considers will achieve the strength requirements specified and will produce a workability which will enable the concrete to be properly compacted to its full depth and finished to the dimensions and within the tolerances shown on the Drawings and required by the Particular Specification.

TS-165 From each trial mix, six Preliminary Test Cubes shall be made and tested at 7 days and four at 28 days, the test at 7 days being intended to give and early indication of possible variation from the required strength. If the difference between the highest and lowest test results from any one trial mix is more than 15 per cent of the average of the strength test results, the test is to be discarded and a further trial mix made, unless all test results so obtained are above the required strength. Separate trial mixes are required for each type of concrete. The trial mix or mixes agreed by the Managing Official shall be designated job mixes and used as a basis for actual concrete production.

3.2.6 Work in cold or hot weather

TS-166 Concrete is not to be mixed or placed at a shade air temperature below 2 deg .C on a rising thermometer or at a shade air temperature below 3 deg .C on a falling thermometer.

TS-167 When the shade air temperature is 37 deg .C and rising, special precautions shall be taken during concreting operations, such as shading of the aggregates and plant, cooling of the mixing water or other methods approved by the Managing Official, so that the temperatures of the concrete when placed shall not be in excess of 39 deg .C.

TS-168 Fresh concrete placed at these temperatures shall be shaded from the direct rays of the sun to the satisfaction of the Managing Official for a period of at least 24 hours.

3.2.7 Placing

TS-169 Concrete shall be conveyed from the mixer to its final position in any suitable manner, provided there is no segregation, loss of ingredients or contamination.

TS-170 It shall be placed in its final position before initial setting takes place and within 20 minutes of the addition of the water to the mixer without using any additives. Water is not allowed, only by the instructions of the Managing Official. In the manufacturer specifications of such additives must be handed over to the Managing Official to be approved before using it.

TS-171 The order of placing concrete shall be such as to prevent water from collecting at the ends, corners and along the faces of forms. It shall not be placed in large quantities at a given point and allowed to run or be worked over a long distance in the form.

TS-172 Whenever possible concrete shall be placed and compacted in even layers with each batch adjoining the previous one.

TS-173 The thickness of the layers shall be between 150 and 300mm for reinforced concrete and up to 450mm for plain (non -reinforced) concrete, the thickness depending on the width of forms, the amount of reinforcement and the need to place .each layer before the previous one stiffens.

TS-174 Concrete shall not be allowed to drop freely for more than 2 meters. To convey the concrete as near as possible to its final position, drop chutes of rubber or metal shall be used for small sections and bottom dump buckets or other suitable vessels for large sections.

TS-175 Concrete shall be carefully compacted when placed to ensure a dense and uniform mass free from air holes and cavities. Concrete type "A", "B"& "C" shall be compacted by vibration , whereas type 'D' and 'E' concrete may be vibrated or rammed , tamped and rodded. Vibration shall be performed by mechanical or electro -mechanical vibrators. The vibrators shall be of the plunger (poker) type for insertion in the concrete:.except that plate type vibrators (external) shall be used if requested by the Managing Official.

TS-176 The plunger (poker) type vibratos shall have a diameter compatible with the lowest spacing of reinforcement, a sufficiently high frequency and be properly handled by experienced personnel.They hall be immersed at regular intervals close enough to vibrate all of the concrete, but not too close to affect previously vibrated and partially set concrete.

TS-177 Each immersion shall continue until shortly after air bubbles cease to appear on the surface of the concrete but shall not last more than 30 seconds. The

vibrators shall be withdrawn gradually and vertically to ensure that no air pockets are formed.

TS-178 When external vibrators are used As directed by the Managing Official, they shall be clamped to the forms whenever possible to avoid large impact during handling, and the forms shall be so constructed as to withstand the additional vibrations.

TS-179 All vibrations, compaction and finishing operations shall be completed within 15 minutes from the time of placing the concrete in its final position. Until it has hardened sufficiently to carry weight without distortion, workers shall not be allowed to walk over freshly placed concrete.

TS-180 Concreting of any one part or section of the work shall be carried out in one continuous operation, and no interruption of concreting work will be allowed without the approval of the Managing Official. Where beams and slabs together form an integral part of the structure they shall be poured in one operation.

TS-181 A record is to be kept by the Contractor on site of the time and date of placing the concrete in each portion of the works and the number and identification of the Works Test Cubes, corresponding to these portions. Such records are to be handed to the Managing Official weekly during the progress of the work.

TS-182 If placing of concrete by pumping is required it shall be specified in the Particular Specification.

3.2.8 Curing

TS-183 Freshly placed concrete shall be protected from rain, dust storms, chemical attack and the harmful effects of heat, wind, flowing water, vibrations and shocks. This protection shall continue until the concrete is sufficiently set such that it is no longer damaged by these factors.

TS-184 The Managing Official shall determine when the protection is no longer required, but in any case this shall not be less than 24 hours after the time of placing.

TS-185 Concrete shall be cured for at least seven days and as required by the Managing Official. Curing shall be effected by the direct application of water to the surface of the concrete or by other approved curing methods or curing compounds applied in accordance with the manufacturers specifications. In case the application of such curing compounds is delayed for any reason, the concrete shall be kept moist until the application is made.

TS-186 Timber formwork covering the concrete shall be moistened with water at frequent intervals to keep it from drying during the curing period. Metal formwork exposed to the sun must be shaded from its direct rays, painted white or otherwise protected during the curing period.

3.3 Reinforcement for concrete

3.3.1 Applicable standards

TS-187 Galvanized steel reinforcement shall comply with S400D and S500C:

- Steel for the reinforcement of concrete B500B / B500C
- Israeli standard IS 4466 Part 3
- Eurocode 2 – Design of concrete structures (EN 1992-1-1)
- Project structural drawings and bar schedules.

3.3.2 Supply & identification

TS-188 Reinforcements shall be delivered as hot-dip galvanized steel bars, SII marked, and accompanied by mill and galvanizing certificates indicating:

- Chemical composition
- Mechanical properties
- Zinc coating thickness (minimum 85 μm unless otherwise specified)
- Compliance with Israeli standards

TS-189 Bars shall be clearly marked with manufacturer's identification, steel grade, batch reference, and galvanizing reference

TS-190 No substitution is permitted without prior written approval from the Structural Engineer.

3.3.3 Storage & handling

- Galvanized steel shall be stored off the ground on wooden sleepers or racks, protected from mud, oil, or standing water
- Care must be taken to avoid damage to the zinc coating during handling and transport.

3.3.4 Quality requirements

TS-191 All reinforcement shall be free from rust and mill scale and any coating such as oil, clay, paint etc which might impair the bond with the concrete.

TS-192 Manufacturer's mill certificates for all classes of reinforcement shall be supplied when required. Specimens sufficient for three tensile tests and three cold-bending tests per ten tons of bars or fraction thereof and for each different size of bar shall be sampled under the supervision of the Managing Official. Testing shall be in accordance with approved standard and batches shall be rejected if the average results for each batch are not in accordance with the specification. All tests should be made on the Contractor's expense.

TS-193 All steel is to be totally free from dirt, paint, loose rust or scale when in position ready for concreting.

TS-194 The Contractor shall cut and bend bars to schedule provided unless otherwise instructed by the Managing Official.

TS-195 Straight sections of bars must be kept out of winding. The internal radius of bends shall in no case be less than four times the diameter of the bar, except for stirrups, column binders, and wall shear bars which are to be bent to fit closely around the main bars..

TS-196 Great care is to be taken to bend stirrups and columns binders separately and to the sizes shown.

TS-197 All bars will be cut and bent cold using approved machines.

TS-198 Lengthening of bars by welding, and rebinding of incorrectly bent bars will not be permitted, except where requested by the Managing Official.

TS-199 The Contractor shall provide on site facilities for hand bending to deal with minor adjustments.

TS-200 Unless otherwise allowed for in the particular specification splices in reinforcing bars shall be formed by lapping. Such laps in bars in any member shall be staggered. Except as otherwise indicated on the drawings the minimum overlap of lapped splices shall be 50 bar diameters or 400mm whichever is greater.

TS-201 The steel is to be fixed in position exactly as indicated; taking in to consideration the seismic requirements and the bars are to be securely wired together with 1.6 or 1.4mm soft iron wire or approved spring steel clips wherever necessary to prevent any displacement during concreting.

TS-202 Spacers, chairs and the like, temporary or permanent, are to be used as required to ensure that the steel has the exact amount of cover indicated. No permanent spacers may show on a surface where a fair faced concrete finish or a brushed aggregate finish are required.Type of spacers shall be approved by the Managing Official before starting the work.

TS-203 The placing of all reinforcement will be checked by the Managing Official and in no case is concrete to be poured around any steel that has not been passed by him. The Contractor is to ensure that no steel is displaced from its position during the placement of concrete and until the concrete is set.

TS-204 The insertion of bars into or removal of bars from concrete already placed will not be permitted. Reinforcement temporarily left projecting from the concrete at the joints shall not be bent without the prior approval of the Managing Official.

TS-205 Secondary reinforced concrete members for which no reinforcement details are given in the drawings or the Particular Specifications shall have a minimum ratio of reinforcement area to concrete area of 0.33 %.

3.4 Formwork for concrete

TS-206 The Contractor shall supply, design, erect, strike and remove the formwork and be entirely responsible for its stability and safety so that it will carry the fresh concrete and all incidental loadings and preserve it from damage and distortion during its placing, vibration, ramming, setting and curing. It shall be so constructed as to leave the finished concrete to the dimensions shown on the Drawings and of a material capable of providing the surface finish specified. In any event, the maximum permissible deflection under all loads shall not exceed l/480 of the free span.

TS-207 For any kind of concrete works ready mix concrete should be used.

TS-208 Formwork shall be of timber and / or metal and shall include all temporary concrete moulds and their supports. Bolts to be used for fixing the formwork shall be approved by the Managing Official before staring the work.

TS-209 Formwork must be designed to resist all loads applied during:

- Concrete pouring,
- Vibrations and compaction,
- Worker and equipment weight.

TS-210 For concrete surfaces, which are to remain, exposed wrought formwork shall be used. Wrought formwork shall be of timber or steel framing lined with 12mm thick smooth-faced plywood or an equal lining approved by the Managing Official, or of metal, suitable to obtain a fair face finish on the concrete. All external angles or fair faced in-site concrete shall have chamfers formed with 20x20mm wrought hardwood angle fillets planted in the angles of the formwork, unless larger chamfers are shown on the drawings.

TS-211 Formwork ready to receive concrete shall be thoroughly clean, smooth with no deformations to prevent leakages. Internal faces shall be properly painted with approved shutter oil or other preparation. All joints shall be tight to prevent leakage.

TS-212 Wherever required and prior to placing of the reinforcement the internal surfaces of all formwork shall be treated with an approved mould oil.

TS-213 All formwork shall be inspected and approved by the Managing Official prior to concreting. This approval, however, does not relieve the Contractor of any of his responsibilities.

TS-214 The striking of all formwork shall be carried out with the greatest of care to avoid damage to concrete. Stripping shall only occur after the concrete has gained sufficient strength. Dismantling must avoid:

- Shocks or impacts on the concrete,
- Pulling out of embedded parts,
- Surface damage.

TS-215 The formwork to vertical surfaces such as walls, columns and sides of beams may be removed in accordance with the table below although care must be taken to avoid damage to the concrete, especially to arises and features.

TS-216 Minimum periods in days for striking other formwork should be in accordance with the following table, or as directed by the Managing Official:

- Ordinary Portland cement Concrete Slabs: 3 (Props left under)
- Beam soffits: 7 (Props left under)
- Props to slabs: 7
- Props to beams: 16
- Vertical surfaces as walls, columns, and sides of beams: 1

TS-217 Formwork, shuttering, props, or any other means of temporary or semi-permanent support shall not be removed from the concrete until the concrete is sufficiently strong to carry safely the load (dead and temporary).

TS-218 The Contractor shall inform the Managing Official when he is ready to strike the formwork, or remove any form of Temporary support, and shall obtain his written consent before proceeding.

TS-219 The times given for the removal of props are based on the assumption that the total live plus dead weight to be supported at the time of removal is not more than one half of the total design load .

TS-220 For horizontal members where the loading is to be a higher proportion of the total design load these times may need to be increased.

TS-221 The Contractor shall be responsible for any damage to the concrete work caused by or arising from the removal and striking of the forms and supports any advice, permission or approval by the Managing Official relative to the removal and striking of forms and supports shall not relieve the Contractor from this responsibility.

TS-222 Any work showing signs of damage through premature loading is to be entirely reconstructed at the Contractor's expense.

TS-223 The Contractor shall confirm positions and details of all

1. Permanent fixings
2. Pipes and conduit
3. Holes and chases

TS-224 To ensure that alterations are not made without the knowledge and approval of the Managing Official.

TS-225 The Contractor shall fix inserts or box out as required to correct positions before placing concrete, and shall form all holes and chases..He shall not cut hardened concrete without approval.

3.4.2 Quality assurance

TS-226 Concrete formwork shall be constructed /erected by the Trade Contractor in accordance with the applicable construction safety regulations at the place of work.

3.4.3 Tolerances per EN 13670

TS-227 Wall thickness: ±10 mm

TS-228 Verticality: ≤5 mm per meter, max 20 mm total deviation

3.4.4 Reference standards

- ACI-347 Recommended Practice for Concrete Formwork
- ISO 22966 – Execution of concrete structures
- EN 12812 – Falsework – Performance requirements and general design
- Eurocode 2 (EN 1992-1-1) – Concrete structure design rules
- Local labour and safety regulations (scaffolding, work at height, etc.)
- Manufacturer’s guidelines for proprietary systems

3.5 Formed finishes

3.5.1 Basic finish

TS-229 General requirements:

1. Produce an even finish with a sheet material.
2. Arrange panels in a regular pattern
3. Blowholes not more than about 10mm in diameter will be permitted but otherwise surface is to be free from voids honey combing and other large defects
4. Variation in colorcolor resulting from the use of an from discoloration due to contamination or grout leakage

TS-230 The finish will be left as struck, making good or small defects will normally be permitted but only after inspection by the Managing Official. All blowholes shall be filled with a matching mortar to an approved sample unless otherwise instructed by the Managing Official. All faces shall be protected from damage, especially arises.

TS-231 All faces shall be protected from rust marks and other surface disfigurements. Form tie holes shall be filled with a matching mortar to an approved sample accepted by the Managing Official.

3.5.2 Fair faced finish

TS-232 Concrete surface which are described as fair face finished shall be finished free from honeycombing and excessive air holes, fines and projections arising from defective mixing, placing of formwork, and shall, if necessary, be filled with mortar and rubbed with fine carborudum stone all works to be approved of Managing Official. The finish shall be integral with the body of the concrete and shall not be obtained by means of an applied rendering.

TS-233 The quality of the surface of concrete exposed to view shall be smooth and consistent throughout the project and the following methods shall be adopted to obtain the required fancy. The trade Contractor may submit alternative proposals for the approval of the Design Professional if he so desires.

TS-234 Formwork for fair faced concrete shall be provide with regular joints to achieved the satisfaction on the job finished, be either of steel, fibrous glass reinforced plastic or exterior grade plywood not less than 16mm before placing, pouring the concrete.

TS-235 All surplus oil on form surface and any oil on reinforcing steel shall be removed.

3.5.3 Approval by the Design Professional to Fair Faced Finishes.

TS-236 The Contractor shall submit for approval of the Managing Official a sample panel not less than 60cm x 120cm to demonstrate the quality of the exposed concrete to be produced by forms, at his own expense.

TS-237 The quality of the finished work shall be measured against the quality of the approved sample panel and the work of inferior quality shall be repaired or replaced as directed by the Managing Official without any additional cost.

TS-238 The quality of the finished surfaces shall be of uniform color and consistency throughout the project..Should there by any inconsistency in color or texture in any of the finished surfaces the Managing Official may order the repair or the demolition of a portion of concrete work and its reconstruction at the Trade Contractor's own expense.

TS-239 Construction Joints, in special cases of weather conditions and if approved by the Managing Official shall be studied in detail ahead of time and the joints shall be grooved in.a predetermined pattern approved by the Managing Official.

TS-240 General Requirements:

1. Produce a smooth even finish with an impervious sheet metal.
2. Make panels as large as is practicable and arrange to approval.
3. Blowhole not more than about 5mm in diameter will be permitted but otherwise surface is to be free from voids, honey combing and other defects.
4. Variation in color resulting from the use of an impervious form lining will be permitted, but the surface is to be free from discoloration due to contamination or grout leakage.
5. Concrete cover spacers shall be used only if approved.
6. Sample on site has to be provided of 1by 2m.

TS-241 The finish is to be left as struck. Making good will not normally be permitted. All form tie holes are to be filled with a matching mortar to an approved sample. Wire form ties shall not be used. With Approval and instruction.of the Managing Official for the position of tie holes is to be obtained before use.

3.6 Quality control testing

TS-242 See also 2.10.3 Implementing documents, 1.6.7.3 Preliminary technical acceptance (Art. 41 -42) and Acceptance of the works performed (Art. 64-65 and 91-92) of the tender specifications.

TS-243 Prior to commencing the work the contractor shall make available on site the following minimum approved equipment kept in good condition at all times:

- Six Cube moulds.
- Slump cones.
- Thermometer.
- Any other accessories as required by the Managing Official.

TS-244 All samples and testing shall be done in the presence of the Managing Official or his authorised representative either on site or in an approved testing laboratory in the area .

TS-245 At least six cubes shall be made at one time (i.e. at each cast). Two of the six cubes are to be tested at seven (7) days. The remaining four cubes are to be tested at 28 days, and their average strength must not fall below the minimum strength specified for each type of concrete and the lowest test result shall not be more than 20% below the average of the four cubes.

TS-246 When the result of 7-day test is unsatisfactory, the Contractor may elect to remove and replace the defective concrete without waiting for the 28-day test. If the result of the 28-day test is unsatisfactory all concreting shall be stopped

at the Contractors expense and shall not proceed further without the written permission of the Managing Official.

TS-247 The Contractor shall then, in accordance with the instructions of the Managing Official, remove cores and test same or conduct in- insitu tests from or on suspect portions of the works, under the supervision of the Managing Official.

TS-248 Concrete judged by the Managing Official to be defective shall be forthwith cut out, removed and replaced at the Contractors own expense .

TS-249 In the event of strengths consistently higher than those specified being obtained, a reduction in the number of tests may be authorized by the Managing Official.

4 Block work

4.1 Manufacture

TS-250 Generally the blocks used shall be of local manufacture made with concrete in approved vibrated pressure machines. The fine aggregate to be used for blocks shall be clean and sharp approved sand. It shall be chemically and structurally stable.

TS-251 The blocks shall be hard, sound, square and clean with sharp well defined arrises and shall, unless previously approved by the Managing Official, be a work size of (400 x 200 x 200mm) with properly formed half blocks for bonding.

TS-252 Hollow blocks, where required, shall be similar quality and overall size to solid blocks, and shall be of local manufacture made with concrete as described above in approved vibrated pressure machines. The thickness of the membranes or solid portions of hollow blocks shall be not less than (30 mm) each and the combined thickness of the solid portion shall exceed one third of the total thickness in either horizontal direction.

TS-253 Arrises shall be sharp and true; blocks which have damaged arrises are not to be used in the works and shall be discarded at the expense of the Contractor.

TS-254 Blocks shall not be removed from the pallets until inspected and approved by the Managing Official.

TS-255 The average crushing strength of solid or hollow blocks shall be not less than 35 kg/cm of gross area (average of 12 blocks).

4.2 Mortars

TS-256 The mortar generally shall be cement and sand (1:4) mix. Furthermore, the sand to be used for mortar shall be clean and sharp.

TS-257 All mortars shall be used before the initial set has begun. Mortar shall not be remixed after the initial set has taken place.

4.3 Construction

TS-258 All blockwork shall be set out and built to the dimensions shown on the Drawings.

TS-259 Walls shall be carried up regularly without leaving any part more than one meter lower than another unless the permission of the Managing Official is first obtained. Work which is left at different levels shall be racked back. In the case of cavity walls, both thicknesses shall not be carried up more than about 400 mm.

TS-260 The courses of blockwork shall be properly leveled. The perpendicular joints shall be properly lined and quoins, jambs and other angles plumbed as the work proceeds.

TS-261 All walls shall be thoroughly bonded in accordance with the best constructional practice and as directed by the Managing Official. Broken blocks shall not be used except where required for bond (if approved by the Managing Official).

TS-262 All concrete blocks shall be soaked with water before being used and the tops of walls left off shall be wetted before work is resumed. The faces of walls shall be kept clean and free from mortar droppings and splashes

TS-263 All blocks shall be properly spread with mortar before being laid and all joints shall be thoroughly flushed up solid through the full thickness of the wall at each course as the work proceeds.

TS-264 For block walls the gauge shall be ten courses to 2100 mm.

TS-265 Walls to be left unplastered shall have a fair face consisting of selected blocks pointed with a neat weathered or flush joint as the work proceeds using the same mortar mix as for jointing.

TS-266 Walls to be plastered shall have the horizontal joints raked out to depth of 8 mm to form a key.

TS-267 Blockwork shall be bonded to concrete columns and the like with 200 x 60 x 6 mm non ferrous metal ties cast in concrete and subsequently bent down, ragged and built into every 2 courses of blockwork. Gunning ties to concrete will not be permitted (other ways of bond must be approved by the Managing Official).

5 Waterproofing

5.1 General

TS-268 This section defines the quality and technical characteristics required for the waterproofing system.

TS-269 Before commencing work, the company shall submit to the Architect, for approval, the details of how the work will be carried out, considering any specific features encountered.

TS-270 The contractor must ensure that the structural design considers the specific requirements necessary for the proper completion of the work, in particular the requirements set out in DTU 43.1.

TS-271 The work to be carried out under this contract shall be finalized in agreement with all the trades concerned (structural work, technical work, etc.).

TS-272 The company shall, as a specialist and by virtue of its professional qualifications, remain responsible for the detailed design of the work concerned, in conjunction with those responsible for the structural work. This detailed design shall be submitted to the Architect before work commences.

5.2 Special requirements

TS-273 All adaptation work and various general or specific constraints inherent to this project shall be included in the unit prices, whether or not they are explicitly stated in this document.

TS-274 The work shall be delivered finished.

TS-275 The contractor must familiarize themselves with the technical specifications of the other trades to be able to submit a complete proposal with full knowledge of the work to be carried out.

TS-276 Companies are reminded of the need to familiarize themselves with the Common Specifications for all trades and with the site obligations and adaptations they will be required to make.

5.3 Supply, transport & Assembly

TS-277 To be provided for all sealing and protective elements required by this project, including all necessary temporary work and assembly.

5.4 Support

TS-278 Before commencing work, the contractor must thoroughly inspect the substrates delivered to them and inform the Architect of any observations.

TS-279 Any commencement of waterproofing work without prior reservation constitutes acceptance of the substrates. No claims will be accepted thereafter.

TS-280 The contractor must include in their quote all the constraints arising from the coordination of their work with that of other trades working on the roof.

TS-281 Before commencing work, the contractor must familiarize themselves with the plans for reservations, holes, and hoppers, and report any provisions that could adversely affect the quality of the waterproofing.

5.5 Materials

TS-282 The contractor must provide the original brand name of the materials or equipment used. The Architect reserves the right to take samples for testing at the contractor's expense.

TS-283 The contractor must strictly follow the technical guidelines provided by the manufacturer of the recommended products.

TS-284 Mortar used for all sealing, filling, netting, flashing, etc. shall be made with mixed mortar. Cement mortar is not allowed.

5.6 Water tightness tests

TS-285 At the request of the Architect, the contractor must provide for watertightness tests on roofs as specified in the NF DTU 43.1 (Israeli Standard 1430/3) These tests must be recorded in a report.

5.7 Guarantees

TS-286 The liability of the waterproofing contractor is ten years liability begins after acceptance.

TS-287 Throughout this period, the contractor shall be responsible for repairing any defects that may become apparent during use, as well as for any necessary replacements, including any damage that may result.

5.8 Protection & Checks

TS-288 As the contractor is solely responsible for their work until the building is accepted, they must ensure that it is protected throughout the duration of the work.

TS-289 At the end of the work, they must ensure that their work is thoroughly cleaned and check that it looks good, that the products are in good condition and that everything is completely watertight.

5.9 Safety obligations

TS-290 The contractor must implement a permanent safety device in accordance with current regulations, including all fastening and installation requirements.

TS-291 The contractor must strictly comply with the safety regulations imposed by the legislation in force, the guidelines of the Control & Work Organizations

TS-292 The contractor shall install and maintain the temporary protective measures necessary for the performance of the work, such as safety railings and protective nets along parapets, various hoppers, etc., and all temporary anchors.

TS-293 The supply of materials to the roof will be carried with all appropriate lifting equipment.

5.10 Shop drawings

TS-294 The contractor must draw up shop drawings plans for the waterproofing works, windows (scale 1/10 or ½ size depending on the case), showing the section and length of the irons, details of sealing, assembly and, in general, all the elements required for the construction of the works.

TS-295 These plans are to be submitted to the Managing Official for acceptance, during the preparation period.

6 Metalworks

6.1 Choice of steel

TS-296 All steel used must be new and conform to current standards defining steel grades and qualities, dimensions and tolerances for merchant bars, plates and cables.

TS-297 Steel structure: the sections of the metal profiles must be determined according to the dimensions of the skylight to guarantee perfect rigidity and sufficient resistance in all cases, considering the stresses that the structures will be subjected to because of wind pressure, the operation of the opening elements, and the metal's own weight.

TS-298 The profiles of the skylight must be pre-drilled (max. 2 points per element) with plugs for future cable routers, if necessary, for contact alarms on the underside of the glass. Location will be defined with the Architect.

TS-299 Metal: Steel

TS-300 Finish: Hot dip galvanizing and painting, color chosen by the Architect.

6.2 Aluminium

TS-301 Aluminum: 6060 T5 aluminum alloy profiles or equivalent, compliant with IS 1516, min. thickness: 1.6 mm (opening sections) and 2 mm (fixed sections or load-bearing profiles).

TS-302 Surface treatment: high-durability polyester coating (QUALICOAT certified) or anodization ≥ 15 microns.

6.3 Frames

TS-303 Mullions and transoms assembled and adapted to the frame according to the type of skylight, including joint grooves and seals, water deflection and hardware adaptation.

TS-304 Drained glazing rebates with glazing beads.

6.4 Rebates

TS-305 Rebates for glazing must always be of height and width suitable for the thickness of the glass to be installed in the rebates, to comply with DTU requirements and applicable regulations.

TS-306 Rebates must be of the “drained rebate” type (see DTU) and designed to accommodate glass products.

6.5 Glazing beads

TS-307 Glazing beads must be designed for easy installation and removal. They must be secured by durable and robust fasteners and be flushed in the corners.

TS-308 This fastening is achieved by clips that have been given protection equivalent to that of the glazing bead.

TS-309 Glazing beads are made of the same material as the joinery profiles, with the same finish as the joinery, and their fastenings are made of non-corrosive materials. Their height must be flush with the height of the rebate.

TS-310 Their dimensions will depend on the thickness of the glazing used, including gaskets and shims. Glazing beads shall always be installed on the inside of the profiles.

6.6 Watertightness

TS-311 Watertightness ensured either by single, double or triple EPDM or PVC gaskets on the periphery of openings and frames, or by double brushes with a plastic core on the opening profiles. These gaskets shall be applied to a compressible foam gasket base. Molded corners or special riders for watertight continuity.

TS-312 The pump seals must be compatible with the supports encountered and must be classified in category 1 PVC washers around the screws.

TS-313 The seals used must be suitable for the required A.E.V. classification, depending on the climate of the project site.

6.7 Hardware & fittings

TS-314 Hardware and fittings shall be of the highest quality (NFQ label required or similar) and robust in relation to the weight and dimensions of the openings. All hardware must be of the highest quality and comply with standards

TS-315 In the case of non-standardized hardware or fittings, the contractor will guarantee his work in the same way as those covered by a standard.

TS-316 They shall be protected against corrosion either by their nature or by definitive treatment at the expense of the present contractor

TS-317 All hardware must be submitted to the Architect for approval. They shall be chosen by the Architect upon presentation of samples.

TS-318 Visible hardware for joinery, including accessories, shall be of the same type as the work in question. Visible fasteners shall be made of stainless steel.

TS-319 The hardware will be positioned to allow for continuous sealing joints. In addition, adjustments will be provided to allow for the adjustment of any gaps between the opening and fixed parts, thereby maintaining the required

TS-320 A.E.V. classification over time.

TS-321 All rotating parts shall be selected according to the weight of the leaves equipped with their glazing.

6.8 Fabrication in the workshop

- Punching & Cutting

TS-322 Punching must be clean and free from settling or tearing. They will be finished with a reamer, with a slight milling of the edges.

TS-323 Work is to be carried out in such a way that all elements are accessible for inspection, control, cleaning, painting and repair.

TS-324 Profiles must be cut cleanly and trimmed after cutting. Flashlight cuts should be straightened and ground. Cutting standard and small profiles is to be carried out exclusively with a grinder or chainsaw.

TS-325 Burs should be removed by grinding.

TS-326 Notches must be straight. The minimum clearance required to assemble the parts must be respected, without however exceeding the tolerances permitted by the standards.

- Blank assembly

TS-327 Some parts will be blank assembled in the workshop.

TS-328 Assemblies will be bolted delicately, avoiding the slightest deformation of other parts.

- Transport

TS-329 Transport and handling operations must be carried out in such a way as to avoid any damage during the transport

TS-330 The most fragile parts will be protected by metal angles or wooden parts. Storage will also be designed to avoid any deterioration.

TS-331 The contractor will be solely responsible for any damage caused during transport, handling or assembly.

6.9 Bolted assemblies

TS-332 All bolted assemblies must meet the requirements of the following documents: Ordinary bolts: ISO 4017

TS-333 HR bolts: ISO 7411 / ISO 7412 (HR/HV/HRC) or DIN 6914 (HV)

TS-334 Bolted joints: ISO 4014 / ISO 4017 / ISO 898-1 / ISO 683-1 / ISO 8129 / ISO 2320

TS-335 HR bolted joints: ISO 7411 / ISO 7412 / ISO 6789

TS-336 All bolts must be marked. HR bolts must be certified SII. They must be galvanized.

TS-337 In normal assemblies, the hole clearance must allow effective tightening of the bolt nut (flat part in contact with the part), failing which an expansion washer must be provided.

TS-338 In no case, in bolted assemblies working in shear, should the threaded part lie in line with a sheared section. For this purpose, washers must be fitted under the nuts.

TS-339 The company must produce a certificate of origin and conformity for High-Strength bolts. The company must provide proof of the correct calibration of the torque wrenches used.

6.10 Welding

TS-340 The company must produce a certificate of origin and conformity for the bolts. The company must provide proof of the correct calibration of the torque wrenches used.

TS-341 Surfaces of parts to be welded must be perfectly clean, free of rust, rolling film, paint, etc...

TS-342 All tube intersections are designed as wolf's mouths with symmetrical overlaps or interface gussets.

TS-343 Butt-welds will be thoroughly hardened. Welds judged to be dangerous or defective will result in rejection of the parts and their rectification.

TS-344 Chamfers for welded joints must be prepared using a planer, chisel, grinder or flashlight. Welding work must be carried out by qualified welders.

TS-345 Welds will be ground if the finish is not perfect.

6.11 On-site assembly

- Assemblies:

TS-346 Galvanized parts: on-site welding of these parts will be carried out after sandblasting the surfaces concerned. After welding, these surfaces will be protected by hot-sprayed zinc.

TS-347 Metallized parts: on-site welding for the assembly of these parts will be subject to recoating and painting. The company is responsible for checking the welds and remedying any defective ones.

- Broaching and drilling:

TS-348 Broaching of assembly elements must be carried out without crushing or deforming the parts.

TS-349 If on-site drilling is necessary, only mechanical means (drill, punch) will be used, excluding flashlights.

- Levelling and shimming:

TS-350 The structural elements must be aligned, levelled and plumbed, and only the tolerances permitted by CM66 rules must be respected.

TS-351 Shims must cover at least 4/5ths of the surface of the contact footings.

TS-352 Only flat sheet metal shims will be used, for the exclusion of U, or I shim, wood shims or other materials.

- Assembly precautions:

TS-353 The contractor must submit, at the same time as his offer, an explanatory note on the implementation of the staircase and the measures he intends to take to ensure perfect assembly of the works, detailing the following points in particular:

- Pre-assembly in the workshop and/or on site.
- Assembly conditions.
- Assembly conditions.
- Safety precautions during assembly.

TS-354 During assembly, special precautions will be taken to ensure temporary bracing of all metal frames

- Earthing of metal masses:

TS-355 All earthing devices are the responsibility of the contractor.

6.12 Hardware works - assemblies

TS-356 Iron and steel for metalworks must be well straightened, well levelled and, if necessary, well forged, without shanks or breaks.

TS-357 Corner and other assemblies must be perfectly adjusted.

TS-358 Depending on the profiles used in the construction of the work, all joints should be either brazed and pinned or directly welded for square, flat, etc. irons, or riveted, brazed or directly autogenously welded mortise and tenon joints for other profiles.

TS-359 Arc welding on stainless steel must be carried out with the utmost care and in compliance with current standards. Screws may also be used.

TS-360 Electric butt welding will be accepted.

6.13 Fixing of skylight

TS-361 The supports shall be accepted before the joinery assemblies are installed.

TS-362 The fixing and assembly devices shall be designed to provide very rigid assemblies, even under

TS-363 the most unfavorable weather conditions. They will be designed to allow adjustment in all three dimensions.

TS-364 Reservations and/or incorporations in the Structural work shall be specified in due course, and their positioning shall consider that of the reinforcements in the case of reinforced concrete supports

TS-365 The position of the joinery fixing devices shall be designed in coordination with the relevant standards.

TS-366 All fastening elements and accessories are included (mounting brackets, bushings, rails, brackets, or other non-visible systems) and shall be made of galvanized steel.

TS-367 The protection of all these elements (brackets, fasteners, etc.) shall be at least equal to hot-dip galvanization of 60 microns of minimum zinc, including cuts, notches, drill holes, etc.

TS-368 Areas damaged during assembly shall be repaired by the contractor by applying a zinc-rich paint

6.14 General consistency of metalwork

TS-369 In addition to the supply, repair and installation of the work, the following services are included:

- Transport to site or supply as required.
- Installation, adjustment, shimming and fixing of the work by grouting.
- Rust protection paint.

TS-370 The contractor will also be responsible for detail drawings and execution plans.

6.15 Dimensioning and stability of works

TS-371 The dimensions indicated on the Architect's drawings and in this Technical Prescription Document must be verified on site by the contractor at the time of fabrication of the skylight.

TS-372 The cross-sections of irons and miscellaneous profiles are given as a guide only.

TS-373 The contractor is responsible for checking them and, if necessary, increasing them to ensure that the work complies with safety standards and regulations.

6.16 Glass skylight

6.16.1 Material quality

TS-374 General description of the skylight:

- Concept: Pyramidal pleated glass roof covering room 4 of the museum
- Locating: See architect's plans and details
- Dimensions: Pyramidal frame according to architect's plans, span approx. 4m
- Support: Concrete structure and masonry

TS-375 Nature of skylight:

TS-376 Both the interior and exterior appearance must be flawless, all exterior parts must be self-cleaning and not susceptible to atmospheric erosion.

TS-377 The profiles used must be of sufficient cross-section to ensure the stability of the assemblies, without visible additional reinforcements.

TS-378 The exterior joinery installed must be covered by a valid certificate, to be provided with the execution Samples on profiles must be provided to the Architect for approval upon award of the contract.

TS-379 Reference brand:

TS-380 The contractor must specify in its quote the brand and type of profiles selected for the realization of its work

TS-381 Glazing:

TS-382 The assemblies shall be equipped with their glazing or other filling material, if applicable. The thickness and quality of the glass shall be determined in accordance with the regulations in force and the manufacturer's technical specifications, depending on their function, location, dimensions/volumes to be glazed, thermal/acoustic performance and burglar resistance

TS-383 All insulating glazing shall be covered by a ten-year warranty and the CEKAL label or similar

TS-384 The service shall include all joints and seals in accordance with the A.E.V. classification required for the skylight. The installation of heavy glazing (over 50 kg) shall be carried out using mechanical means.

TS-385 Before making their final choice, the Architect and the Project Owner will be presented with prototypes on site to determine which is best suited to their project.

TS-386 The contractor shall submit all calculation notes justifying the type and thickness of the glass elements in accordance with the constraints.

TS-387 Steel frames

To be fixed to profiles forming fixed frames:

- Support piece
- Water drainage on basis supports
- High and lower crossbars, fixed frames, uprights and intermediate crossbars forming glazed areas for fixed assemblies.
- Drained glazing rebates with glazing beads for fixed units.
- Assembled and fitted frames and crossbars adapted to the frame, including joint grooves and seals, water drainage and adaptation of fittings.
- Drained glazing rebates with glazing beads

TS-388 Aluminum frames:

TS-389 To be fixed to profiles forming fixed frames:

- Support piece
- Water drainage on basis supports
- High and lower crossbars, fixed frames, uprights and intermediate crossbars forming glazed areas for fixed assemblies.
- Drained glazing rebates with glazing beads for fixed units.
- Assembled and fitted frames and crossbars adapted to the frame, including joint grooves and seals, water drainage and adaptation of fittings.
- Drained glazing rebates with glazing beads

TS-390 Glazing beads:

Glazing beads are made from the same materials as the profiles used for the skylight, with the same finish as the joinery and suitable for the thickness of the glazing to be installed. The glazing beads will be fitted to the inside of the profiles.

6.16.2 Performance and characteristics of glazing

TS-391 Definition of project exposure according to Eurocode 1 - Part 1-4: General actions - Wind action:

- Wind: Zone 4 (31 to 33 m/s) - Jerusalem – Vb0 = 32 m/s – Local standard SI 414 idem as Eurocode
- Altitude < 1000 meters (around 800 meters)

TS-392 Glazing:

Low-emissivity double glazing with argon filling from SAINT GOBAIN GLASS or equivalent Thickness according to the area to be glazed, installed with glazing beads.

Burglar resistance rating: P6B or similar

TS-393 Thermal:

Double-glazed low emissivity with argon gas:

- Ug: 1.6 W/m².°C
- Solar factor: Sw= 0.28
- Transmission factor: Tlw= 0.49

TS-394 Acoustics:

In the absence of acoustic constraints, canopies will have a minimum sound reduction of 30 dB.

TS-395 Nomenclature of infill and glazing for exterior joinery (to be confirmed by the architect) Double insulation glazing with clear glass, 2 laminated sides

- one laminated glass, with UV reflective or selective film: g = 0,30 to 0,55
- one with enhanced protection against vandalism and burglary, class P6B.

TS-396 Fire Security:

Not applicable

6.16.3 Hardware & accessories

TS-397 Hardware and accessories must always be of a size and strength appropriate to the dimensions and weight of the glazing.

TS-398 They must be at least class WK 1 for enhanced protection in accordance with DIN V EN V 1627-1630 and DIN RAL-RG 607/13:

- Hinges pins
- Latches
- Reinforcements
- Brackets

TS-399 Choice of samples and colors at the discretion of the Architect

6.16.4 Reservations & Incorporations

TS-400 The contractor must make all reservations in the skylight for the integration of hardware and safety equipment (DAS equipment, opening contactors, etc.).

6.16.5 Caulking

TS-401 Particular care shall be taken when caulking and sealing exterior canopies to prevent air leaks that could interfere with the proper functioning of the ventilation system

TS-402 The joints between the frame and the walls support must be treated to prevent moisture from stagnating. The caulking and sealing elements must therefore be permeable to water vapor to promote internal/external exchange depending on pressure differences and allow any residual moisture to present in the wall elements to escape.

TS-403 For this reason, the contractor must provide a waterproof barrier on the exterior side The treatment of each joint must meet the following criteria:

- Ensure the continuity of air and water tightness, despite the differential expansion of the various elements.
- Avoid the presence of moisture in the joint
- Ensure the continuity of thermal and acoustic insulation

TS-404 The contractor's services shall include perfect sealing

TS-405 The package shall include all supply, production, and installation requirements to achieve the objective of airtightness.

6.17 Shop drawings

TS-406 The contractor must draw up execution plans for the metalworks of the stained-glass windows (scale 1/10 or ½ size depending on the case), showing the section and length of the irons, details of sealing, assembly and, in general, all the elements required for the construction of the works.

TS-407 These plans are to be submitted to the Managing Official for acceptance, during the preparation period.

7 Room 4 - Glass skylight

7.1 Demolish stone counterfort

TS-408 Partial demolition of a stone wall, limited to the head, to height defined according to the plans or instructions of the Structural Engineer, the work includes:

- Protecting the area around the work site (existing roof, etc.)
- Demolition using power tools to avoid excessive vibration that could affect the preserved structure.
- Chipping, dismantling, or sawing of the stone wall head to the level indicated on the plans or marked on site.
- Maintaining the stability of parts of the wall not affected by demolition.
- Cleaning and securing the preserved wall sections.
- Coordination with other trades, particularly for my modifications to networks, cables, etc.
- The contractor must ensure careful removal, as we do not plan to carry out any finishing work on it.

TS-409 Location: stone counterfort on roof, see architect's plan.

7.2 Demolish concrete block parapet

TS-410 Demolition of a low wall made of hollow or solid concrete blocks (depending on site conditions), outside, in accordance with the plans and instructions of the Structural Engineer, the work includes:

- Installation of protective for neighbouring structures, etc.
- Demolition method adapted to avoid any harmful vibrations to adjacent structures (walls, slabs, etc.)
- Mechanical demolition of the concrete block wall (sawing of the wall if necessary)
- Clean cutting at the ends if necessary for connections or partial preservation
- Cleaning and securing the site at the end of the work
- Partial removal of the waterproofing will be necessary and included

TS-411 Location: low wall around the edge of the chute in the courtyard, see architect's plans

7.3 Creation of concrete support wall

TS-412 Generalities: execution of reinforced concrete structures on site casted reinforced concrete of sufficient sections to distribute the loads of the skylight in accordance with the Structural Engineer study.

TS-413 The work shall include all demolition and requirements necessary for the perfect implementation of the concrete, shaping of the steel, shoring, formwork, reservations, etc.

TS-414 The structures shall be executed in accordance with the structural plans of the Structural Engineer.

TS-415 Miscellaneous requirements: the Structural study will be drawn up in accordance with the requirements set out by:

- Eurocodes
- The construction rules set out in NF DTU 21 (Israeli Standards 118 and 4466)
- Standard 18-305 for ready-mixed concrete
- As well as all technical specifications defining the rules of good practice in this field

TS-416 All voids shall be reserved in reinforced concrete structures for hoppers and various passages, including all entanglements.

TS-417 Hoppers larger than 2 dm^2 reserved for the passage of pipes and other items shall be filled in by the contractor at its own expense. Those of smaller dimensions shall be filled in at the expense of the contractor who reserved them.

TS-418 The materials used must be approved by the Managing Official.

TS-419 The formwork shall be constructed in accordance with best practice and shall allow for rough, smooth or neat formwork removal surfaces, as required and specified in these Technical Specifications Document

TS-420 List of reinforced structures: the following structures shall be constructed in reinforced concrete, without this list being exhaustive for all structures.

TS-421 All concrete structures intended to remain unfinished shall be particularly well cared for, as specified in the plans.

TS-422 No defects in planimetry, plumbness, angles, breaks, or lack of concrete will be accepted, and in the event of failure, the works will be destroyed and redone.

TS-423 The contractor shall perform all work without arguing errors, omissions, or contradictions with the plans to avoid performing the work in a workmanlike manner or requesting additional payments for the project in question.

TS-424 The bill of quantities shall include the supply of materials, installation, steel shaping, scaffolding, and the necessary reservations for finishing work, rebates, and in general all fasteners to be incorporated into the concrete elements.

TS-425 The work will be carried out in accordance with the structural plans provided by the Structural Engineer

TS-426 Location.

- For the construction of the following structures:
- Posts
- Beams
- Lintels
- Vertical and horizontal chains
- Levelling at the top of existing wall
- Vertical and horizontal stiffeners
- Parapets
- Etc.

7.4 Picking the existing surface for adhesion

TS-427 This clause specifies the technical requirements for the picking of existing surfaces to ensure optimal adhesion of new concrete structures

TS-428 The Contractor shall carry out the mechanical preparation of existing substrates by picking, scabbling, or similar surface treatment to create a mechanical key (rough profile) appropriate to the type of subsequent material to be applied.

TS-429 Accepted techniques for surface picking include:

- Manual chiselling or hacking for small areas or delicate substrates.
- Mechanical scabbling, bush hammering, or needle gunning for larger or harder surfaces.

TS-430 Location.

- Concrete low wall, see Structural Engineer's plans

7.5 Concrete

TS-431 Cement:

- Type CEM I or CEM II, conforming to EN 197-1 and recommendations of Structural Engineer

TS-432 Aggregates:

- Clean, hard, well-graded, and conforming to EN 12620
- Maximum aggregates size: typically 16-20 mm for walls, unless otherwise specified

TS-433 Mixing water:

- Clean, free of harmful impurities, conforming to EN 1008

TS-434 Admixtures:

- Only approved admixtures (plasticizers, superplasticizers, retarders, etc.) conforming to EN 934-2 are permitted based on concrete performance requirements

TS-435 Location.

- Concrete low wall, see Structural Engineer's plans

7.6 Galvanized steels

7.6.1 Applicable standards:

TS-436 Galvanized steel reinforcement shall comply with S400D and S500C:

- Steel for the reinforcement of concrete B500B / B500C
- Israeli standard IS 4466 Part 3
- Eurocode 2 – Design of concrete structures (EN 1992-1-1)
- Project structural drawings and bar schedules.

7.6.2 Supply & identification:

TS-437 Reinforcements shall be delivered as hot-dip galvanized steel bars, SII marked, and accompanied by mill and galvanizing certificates indicating:

- Chemical composition
- Mechanical properties
- Zinc coating thickness (minimum 85 µm unless otherwise specified)
- Compliance with Israeli standards

TS-438 Bars shall be clearly marked with manufacturer's identification, steel grade, batch reference, and galvanizing reference

TS-439 No substitution is permitted without prior written approval from the Structural Engineer.

TS-440 Storage & handling:

- Galvanized steel shall be stored off the ground on wooden sleepers or racks, protected from mud, oil, or standing water
- Care must be taken to avoid damage to the zinc coating during handling and transport
- In case of localized damage, repair of the coating shall be done using zinc-rich paint conforming to EN ISO 14657 or as approved by the Engineer.

TS-441 Placement and Installation:

- Reinforcements shall be placed accurately per structural drawings and tied with galvanized annealed wire
- Concrete cover shall be as indicated in the drawings, typically:
- 25–40 mm for walls depending on exposure class and fire rating
- Use of plastic or galvanized spacers/chairs is mandatory to maintain cover
- Rebar must be clean and free from loose rust, oil, or contaminants, with intact zinc coating at the time of concreting

TS-442 Location.

- Installation in concrete low wall, see Structural Engineer's plans

7.7 Formwork

7.7.1 Applicable Standards:

TS-443 The formwork system and execution must comply with:

- ISO 22966 – Execution of concrete structures
- EN 12812 – Falsework – Performance requirements and general design
- Eurocode 2 (EN 1992-1-1) – Concrete structure design rules
- Local labour and safety regulations (scaffolding, work at height, etc.)
- Manufacturer's guidelines for proprietary systems

7.7.2 Design and load resistance:

TS-444 Formwork must be designed to resist all loads applied during:

- Concrete pouring
- Vibration and compaction
- Worker and equipment weight Must ensure:
- Shape and dimension accuracy
- No deformation or leakage
- Smooth, clean surfaces

TS-445 Tolerances per EN 13670:

- Wall thickness: ±10 mm
- Verticality: ≤5 mm per meter, max 20 mm total deviation

TS-446 Assembly and Installation:

TS-447 Formwork shall be:

- Plumbed, levelled, and braced to ensure stability
- Assembled to ensure tight joints, preventing leakage of cement paste
- Fitted with chamfers (typically 20x20 mm) at all visible corners unless otherwise specified All inserts (sleeves, pipes, box-outs, etc.) must be positioned before concrete pouring

TS-448 Access and safety platforms must be integrated when working at height

TS-449 Stripping and Removal:

- Stripping shall only occur after concrete has gained sufficient strength Dismantling must avoid:
- Shocks or impacts on the concrete
- Pulling out of embedded parts
- Surface damage

TS-450

TS-451 Location.

- Concrete low wall, see Structural Engineer's plans

7.8 Filling openings with concrete blocks

TS-452 The contractor shall carry out the temporary closure of new openings (windows in the masonry supports the skylight) using hollow or solid concrete blocks, in accordance with the construction drawings, the work shall include:

- Supply and delivery of all required materials to the roof level
- Preparation of the opening edges (cleaning, levelling, moistening).
- Construction of a masonry base using standard concrete blocks (dimensions and strength as per plans).
- Mechanical anchoring or bonding of new blocks to existing structure (e.g. reinforcing bars, chemical anchors or bonding mortar).
- Laying of the blocks with controlled cement mortar
- Installation of horizontal and/or /vertical ties or stiffness, if specified the structural design
- Careful filling and alignment of the openings
- Finish to a level ready for waterproofing works

TS-453 Location:

- All openings in the concrete support of the skylight, see Structural Engineer's plans

7.9 Waterproofing

7.9.1 Waterproofing of concrete upstands

TS-454 Installation of non-insulated waterproofing on upstands, in accordance with IS 1430/3 and the technical guidelines provided by the supplier for the selected system. The waterproofing will be applied on raised masonry elements and includes the following:

TS-455 Support: Concrete support (masonry) No thermal insulation

TS-456 Waterproofing system:

TS-457 Supply and installation of a bituminous membrane waterproofing system from PAZKAR or equivalent, composed of the following components:

- Preparation of reinforced concrete substrates, clean, dry, and free of dust
- Application of a triangular-shaped elastomeric bitumen joint, such as RALKA or equivalent, applied at corners between vertical and horizontal surfaces
- Application of a cold-applied elastomeric bituminous mastic, such as PAZKAROL 18 or equivalent
- Installation of a bituminous angle bracket, made of polymer-modified bituminous membrane with an anti-root additive and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent

TS-458 The backet shall be installed with a horizontal heel of at least 6 cm above the upper membrane level.

- Installation of a second layer of polymer-modified bituminous membrane with anti-root additives and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent
- Installation of a third layer of SBS polymer-modified bituminous membrane, reinforced with polymer and covered with a top coating of white mineral aggregates, 5 mm thick, such as POLYPAZ or equivalent

TS-459 Insulation: Not applicable

TS-460 The top edge of the waterproofing strip must be protected by a device designated to prevent the ingress of runoff water.

TS-461 Installation shall be carried out in accordance with the supplier's instructions, relevant standards, and IS 1430/3 Particular care shall be taken at connections with upstands, water inlets, roof outlets, and other special elements.

TS-462 Expansion joints be executed in compliance with the technical approval for the selected product.

TS-463 Note:

- The waterproofing flashings will be raised against the walls and parapets up to the protective elements (flashing strip at the foot of the cladding, copings, etc., according to the architect's plans and sections)
- Includes all work required to ensure a perfect connection between the floor and the risers
- The work will include repairing the peripheral floor waterproofing around the skylight.

TS-464 Location:

- Waterproofing of the walls supporting the skylight, see architect's plans.

7.10 Steel skylight structure

7.10.1 Scaffolding additions and protections

TS-465 Scaffolding is provided by the contractor.

TS-466 The contractor will be responsible for all additional scaffolding required for the implementation of his works, with a working floor positioned on the top floor, allowing access to the upper parts of the framework, as well as all protection required for the completion of the works.

TS-467 Location:

- For the installation of the skylight in Room 4

7.10.2 Steel skylight with glass facings, size 575 x 436 x 93 cm

TS-468 All dimensions of the skylight must be verified on site prior to manufacturing. Supply and installation of steel skylight, size 575 x 436 x 93 cm

TS-469 Finish: Hot dip galvanizing and painting, architect's choice from a wide range

TS-470 Frame

- Frame and support pieces
- Rounded support and water splash
- Double air and water joint
- Condensation water collection groove
- EPDM glazing seals and old-fashioned glazing beads
- Joint covers
- Installation and mounting accessories, sealing brackets, etc.

TS-471 Hardware & accessories:

Not applicable

TS-472 Glass:

According to article "Performance and characteristics of joinery and glazing"

- Outdoor: Single laminated glass with solar protection on interior face
- Indoor: Single glass with protection against vandalism and burglary, **class P6B** or similar, with **UV protection film.**

TS-473 Miscellaneous:

- Connecting profiles between the various frames and all necessary fixtures for assembly. All manufacturing, fastening, and sealing components.
- Supply and installation of the entire system in accordance with the industry's best practices, standards, and
- applicable DTU regulations.

TS-474 Nota bene: Without fire resistance,

TS-475 The contractor shall include all fixings in concrete structure (chemical anchors, etc.)

TS-476 Location:

For the skylight in Room 4, see architect's plans

7.11 Ditto, Aluminium skylight structure

7.11.1 Aluminum skylight with glass facings, size 575 x 436 x 93 cm

TS-477 All dimensions of the skylight must be verified on site prior to manufacturing. Supply and installation of aluminum skylight, size 575 x 436 x 93 cm

TS-478 Finish: High-durability polyester coating (QUALICOAT certified) or anodization ≥ 15 microns.

TS-479 Frame

- Frame and support pieces
- Rounded support and water splash
- Double air and water joint

- Condensation water collection groove
- EPDM glazing seals and old-fashioned glazing beads
- Joint covers
- Installation and mounting accessories, sealing brackets, etc.

TS-480 Hardware & accessories:

Not applicable

TS-481 Glass:

According to article “Performance and characteristics of joinery and glazing”

- Outdoor: Single laminated glass with solar protection on interior face
- Indoor: Single glass with protection against vandalism and burglary, class P6B or similar, with UV protection film.

TS-482 Miscellaneous:

- Connecting profiles between the various frames and all necessary fixtures for assembly. All manufacturing, fastening, and sealing components.
- Supply and installation of the entire system in accordance with the industry’s best practices, standards, and
- applicable DTU regulations.

TS-483 Nota bene: Without fire resistance

TS-484 The contractor shall include all fixings in concrete structure

TS-485 Location:

- For the skylight in Room 4, see architect’s plans.

8 Room 6 - Concrete slab structrure

8.1 Removal of vegetablization

TS-486 The contractor must completely remove a vine growing on the facade of the building, including:

- Manual or mechanical cutting of visible vegetation down to the base of the main stems.
- Pulling up the roots as far as possible or treating them using an approved method (approved plant protection product)
- Removing all plant residues (stems, leaves, roots) from the facade, gutters, roofs, or other elements in contact with the vines
- The condition of the substrate must be checked after the vegetation has been removed (cracking, flaking, peeling, etc.) and any anomalies must be reported to the Architect
- Green waste must be disposed of at an approved facility

TS-487 Location.

- Vine in Room 6, see Structural Engineer's plans.

8.2 Demolish stone block wall

TS-488 Demolition of a low wall made stone blocks, outside, in accordance with the plans and instructions of the Structural Engineer, the work includes:

- Installation of protective for neighbouring structures, etc.
- Demolition method adapted to avoid any harmful vibrations to adjacent structures (walls, slabs, etc.)
- Mechanical demolition of the stone block wall (sawing of the wall if necessary)
- Clean cutting at the ends if necessary for connections or partial preservation
- Cleaning and securing the site at the end of the work

TS-489 Location.

- Stone block wall on the roof, see Architect's plans

8.3 Creation of a trench for the creation of a channel

TS-490

TS-491 Creation of a recess in an existing concrete or natural stone surface for the installation of a water collection channel.

TS-492 Excavation by mechanical and manual means to the depth and width specified in the plan, including:

- Clean sawing or chiselling of edges
- Removal of rubble
- Cleaning of the bottom of the reservation.

TS-493 Preparation of the bottom for receiving the gutter (mortar bed or sealing, as specified)

TS-494 Compliant with the flatness and elevation tolerances indicated on the construction drawings. Compliance with collection slopes, if integrated.

TS-495 Location.

- For the continuous channel at the base of the parapet created, see Architect's plans

8.4 Creation of concrete wall

TS-496 Generalities:

TS-497 Execution of reinforced concrete structures on site casted reinforced concrete of sufficient sections to distribute the loads of the skylight in accordance with the Structural Engineer study.

TS-498 The work shall include all requirements necessary for the perfect implementation of the concrete, shaping of the steel, shoring, formwork, reservations, etc.

TS-499 The structures shall be executed in accordance with the structural plans of the Structural Engineer.

TS-500 Miscellaneous requirements:

TS-501 The Structural study will be drawn up in accordance with the requirements set out by:

- Eurocodes
- The construction rules are set out in NF DTU 21 (Israeli Standards 118 and 4466)
- Standard 18-305 for ready-mixed concrete
- As well as all technical specifications defining the rules of good practice in this field

TS-502

TS-503 All voids shall be reserved in reinforced concrete structures for hoppers and various passages, including all entanglements.

TS-504 Hoppers larger than 2 dm² reserved for the passage of pipes and other items shall be filled in by the contractor at its own expense. Those of smaller dimensions shall be filled in at the expense of the contractor who reserved them.

TS-505 The materials used must be approved by the Structural Engineer.

TS-506 The formwork shall be constructed in accordance with best practice and shall allow for rough, smooth or neat formwork removal surfaces, as required and specified in these Technical Specifications Document

TS-507 List of reinforced structures:

TS-508 The following structures shall be constructed in reinforced concrete, without this list being exhaustive for all structures below

- All concrete structures intended to remain unfinished shall be particularly well cared for, as specified in the plans.
- No defects in planimetry, plumbness, angles, breaks, or lack of concrete will be accepted, and in the event of failure, the works will be destroyed and redone.
- The contractor shall perform all work without arguing errors, omissions, or contradictions with the plans to avoid performing the work in a workmanlike manner or requesting additional payments for the project in question.

TS-509 The bill of quantities shall include the supply of materials, installation, steel shaping, scaffolding, and the necessary reservations for finishing work, rebates, and in general all fasteners to be incorporated into the concrete elements.

TS-510 The work will be carried out in accordance with the structural plans provided by the Structural Engineer

TS-511 Location.

- Concrete parapet, see Structural Engineer's plans
- Concrete slab, see Structural Engineer's plans

8.5 Picking the existing surface for adhesion

TS-512 This clause specifies the technical requirements for the picking of existing surfaces to ensure optimal adhesion of new concrete structures

TS-513 The Contractor shall carry out the mechanical preparation of existing substrates by picking, scabbling, or similar surface treatment to create a mechanical key (rough profile) appropriate to the type of subsequent material to be applied.

TS-514 Accepted techniques for surface picking include:

- Manual chiselling or hacking for small areas or delicate substrates.
- Mechanical scabbling, bush hammering, or needle gunning for larger or harder surfaces.

TS-515 Location.

- Concrete parapet, see Structural Engineer's plans

8.6 Concrete

TS-516 Cement:

Type CEM I or CEM II, conforming to EN 197-1 and recommendations of Structural Engineer

TS-517 Aggregates:

Clean, hard, well-graded, and conforming to EN 12620

Maximum aggregates size: typically 16-20 mm for walls, unless otherwise specified

TS-518 Mixing water:

Clean, free of harmful impurities, conforming to EN 1008

TS-519 Admixtures:

Only approved admixtures (plasticizers, superplasticizers, retarders, etc) conforming to EN 934-2 are permitted based on concrete performance requirements

TS-520 Location.

- Concrete parapet and slab, see Structural Engineer's plans

8.7 Galvanized steels

TS-521 Applicable standards:

TS-522 Galvanized steel reinforcement shall comply with S400D and S500C:

- Steel for the reinforcement of concrete B500B / B500C
- Israeli standard IS 4466 Part 3
- Eurocode 2 – Design of concrete structures (EN 1992-1-1)
- Project structural drawings and bar schedules.

TS-523 Supply & identification:

TS-524 Reinforcements shall be delivered as hot-dip galvanized steel bars, SII marked, and accompanied by mill and galvanizing certificates indicating:

- Chemical composition
- Mechanical properties
- Zinc coating thickness (minimum 85 μm unless otherwise specified)
- Compliance with Israeli standards

TS-525 Bars shall be clearly marked with manufacturer's identification, steel grade, batch reference, and galvanizing reference

TS-526 No substitution is permitted without prior written approval from the Structural Engineer.

TS-527 Storage & handling:

- Galvanized steel shall be stored off the ground on wooden sleepers or racks, protected from mud, oil, or standing water
- Care must be taken to avoid damage to the zinc coating during handling and transport
- In case of localized damage, repair of the coating shall be done using zinc-rich paint conforming to EN ISO 14657 or as approved by the Engineer.

TS-528 Placement and Installation:

- Reinforcements shall be placed accurately per structural drawings and tied with galvanized annealed wire
- Concrete cover shall be as indicated in the drawings, typically:
- 25–40 mm for walls depending on exposure class and fire rating
- Use of plastic or galvanized spacers/chairs is mandatory to maintain cover
- Rebar must be clean and free from loose rust, oil, or contaminants, with intact zinc coating at the time of concreting

TS-529 Location.

- Concrete parapet and slab, see Structural Engineer's plans

8.8 Formwork

TS-530 Applicable Standards:

TS-531 The formwork system and execution must comply with:

- EN 13670 – Execution of concrete structures
- EN 12812 – Falsework – Performance requirements and general design
- Eurocode 2 (EN 1992-1-1) – Concrete structure design rules
- Local labour and safety regulations (scaffolding, work at height, etc.)
- Manufacturer's guidelines for proprietary systems

TS-532 Design and load resistance:

TS-533 Formwork must be designed to resist all loads applied during:

- Concrete pouring
- Vibration and compaction
- Worker and equipment weight

TS-534 Must ensure:

- Shape and dimension accuracy
- No deformation or leakage
- Smooth, clean surfaces

TS-535 Tolerances per EN 13670:

- Wall thickness: ±10 mm
- Verticality: ≤5 mm per meter, max 20 mm total deviation.

TS-536 Assembly and Installation:

TS-537 Formwork shall be:

- Plumbed, levelled, and braced to ensure stability
- Assembled to ensure tight joints, preventing leakage of cement paste
- Fitted with chamfers (typically 20x20 mm) at all visible corners unless otherwise specified All inserts (sleeves, pipes, box-outs, etc.) must be positioned before concrete pouring

TS-538 Access and safety platforms must be integrated when working at height

TS-539 Stripping and Removal:

- Stripping shall only occur after concrete has gained sufficient strength Dismantling must avoid:
- Shocks or impacts on the concrete
- Pulling out of embedded parts
- Surface damage

TS-540 Location.

- Concrete parapet and slab, see Structural Engineer's plans

8.9 Creation of composite floor slab

8.9.1 Steel profile UPN 180, incl. hardware

TS-541 Supply and installation of UPN 180 metal profiles made of S235JR steel in accordance with EN 10025-2, including all assembly and fastening accessories (hardware)

TS-542 UPN 180 profiles will be used to construct a collaborative metal form slab, in accordance with the construction plans and layout plan

- Hot-rolled UPN 180 profile, length according to plans.
- Surface treatment: galvanized

TS-543 Fittings including:

- Perforated mounting plates (thickness and perforation according to plans),
- Assembly angle brackets
- Threaded rods, bolts (minimum class 8.8)
- Washers and lock nuts
- Gussets or stiffeners if necessary
- Any connecting elements for load bearing or anchoring

TS-544 Implementation:

- Cutting, drilling, assembly, and welding in the workshop or on site, according to the execution plan.
- Implementation in accordance with IS 1225, IS 4466 and IS 1090

- Fixing to masonry using chemical anchoring or mechanical anchoring, depending on the forces to be absorbed.
- Checking that the structure is plumb and level before final anchoring.

TS-545 Location.

- Composite floor slab in Room 6, see Structural Engineer's plans

8.9.2 Steel profile IPE 140, incl. hardware

TS-546 Supply and installation of IPE 140 metal profiles made of S235JR steel in accordance with EN 10025-2, including all assembly and fastening accessories (hardware)

TS-547 IPE 140 profiles will be used to construct a collaborative metal form slab, in accordance with the construction plans and layout plan

- Hot-rolled IPE 140 profile, length according to plans.
- Surface treatment: galvanized

TS-548 Fittings including:

- Perforated mounting plates (thickness and perforation according to plans),
- Assembly angle brackets
- Threaded rods, bolts (minimum class 8.8)
- Washers and lock nuts
- Gussets or stiffeners if necessary
- Any connecting elements for load bearing or anchoring

TS-549 Implementation:

- Cutting, drilling, assembly, and welding in the workshop or on site, according to the execution plan.
- Implementation in accordance with IS 1225, IS 4466 and IS 1090
- Fixing to masonry using chemical anchoring or mechanical anchoring, depending on the forces to be absorbed.
- Checking that the structure is plumb and level before final anchoring.

TS-550 Location.

- Composite floor slab in Room 6, see Structural Engineer's plans

8.9.3 Chemical anchors

TS-551 Supply and installation of chemical anchors with galvanized steel threaded rods

TS-552 The chemical anchors will be used to fix UPN 180s to load-bearing walls made of concrete or stone. Includes:

- Drilling to the appropriate diameter
- Cleaning by blowing and brushing
- Injection of resin,
- Installation of threaded rods (class 8.8 min.),
- Allowing for setting time before loading.

TS-553 Implementation:

TS-554 Compliant with manufacturer's specifications (ETA and ICC-ES) and SI 118

TS-555 Location.

- Composite floor slab in Room 6, see Structural Engineer’s plans

8.9.4 Metal Decking Hi Bond A55/P600

TS-556 Supply and installation of Hi-Bond A55 composite steel decking, rib spacing 600 mm (P600), for reinforced concrete slab support

TS-557 Galvanized steel ribbed tray compliant with standard SI 504, thickness ≥ 0.75 mm, Z275 galvanization. Installation on load-bearing frame with longitudinal and transverse overlap in accordance with SI 1225 and SI 4466

TS-558 Mechanical fastening with self-drilling screws or powder-actuated fasteners on metal structure. Compliant with manufacturer's specifications and applicable regulations.

TS-559 The mesh sheets and additional reinforcement are laid out according to the plan. Temporary shoring if necessary, depending on span and loads.

TS-560 Location.

- Composite floor slab in Room 6, see Structural Engineer’s plans

8.9.5 Galvanized steels

TS-561 Applicable standards:

TS-562 Galvanized steel reinforcement shall comply with S400D and S500C:

- Steel for the reinforcement of concrete B500B / B500C
- Israeli standard IS 4466 Part 3
- Eurocode 2 – Design of concrete structures (EN 1992-1-1)
- Project structural drawings and bar schedules.

TS-563 Supply & identification:

TS-564 Reinforcements shall be delivered as hot-dip galvanized steel bars, SII marked, and accompanied by mill and galvanizing certificates indicating:

- Chemical composition
- Mechanical properties
- Zinc coating thickness (minimum 85 μm unless otherwise specified)
- Compliance with Israeli standards

TS-565 Bars shall be clearly marked with manufacturer’s identification, steel grade, batch reference, and galvanizing reference

TS-566 No substitution is permitted without prior written approval from the Structural Engineer.

TS-567 Storage & handling:

- Galvanized steel shall be stored off the ground on wooden sleepers or racks, protected from mud, oil, or standing water

- Care must be taken to avoid damage to the zinc coating during handling and transport
- In case of localized damage, repair of the coating shall be done using zinc-rich paint conforming to EN ISO 14657 or as approved by the Engineer.

TS-568 Placement and Installation:

- Reinforcements shall be placed accurately per structural drawings and tied with galvanized annealed wire
- Concrete cover shall be as indicated in the drawings, typically:
- 25–40 mm for walls depending on exposure class and fire rating
- Use of plastic or galvanized spacers/chairs is mandatory to maintain cover
- Rebar must be clean and free from loose rust, oil, or contaminants, with intact zinc coating at the time of concreting

TS-569 Location.

- Composite floor slab in Room 6, see Structural Engineer's plans

8.9.6 Concrete

TS-570 Cement:

Type CEM I or CEM II, conforming to EN 197-1 and recommendations of Structural Engineer

TS-571 Aggregates:

Clean, hard, well-graded, and conforming to EN 12620

Maximum aggregates size: typically 16-20 mm for walls, unless otherwise specified

TS-572 Mixing water:

Clean, free of harmful impurities, conforming to EN 1008

TS-573 Admixtures:

Only approved admixtures (plasticizers, superplasticizers, retarders, etc) conforming to EN 934-2 are permitted based on concrete performance requirements

TS-574 Location.

- Composite floor slab in Room 6, see Structural Engineer's plans

8.9.7 Surfacing

TS-575 The contractor must resurface the freshly poured concrete slab to obtain a surface suitable for its end use: waterproofing substrate.

TS-576 Execution:

TS-577 Surface must be leveled immediately after placing and compacting concrete. Finishing operations shall begin after bleeding water has evaporated.

TS-578 Troweling or floating must be done:

- By hand or with power trowel, depending on area size

- In multiple passes as needed to close pores and level surface Edges and joints must be neatly detailed and finished.

TS-579 Location.

- Composite floor slab in Room 6, see Structural Engineer's plans

8.10 Waterproofing

8.10.1 Waterproofing of standard concrete surfaces

TS-580 Installation of non-insulated waterproofing on common parts, in accordance with IS 1430/3 and the technical guidelines provided by the supplier for the selected system. The waterproofing will be applied on concrete slabs and includes the following:

TS-581 Support: Concrete support (masonry) No thermal insulation Slope between 0 to 5%

TS-582 Waterproofing system:

TS-583 Supply and installation of a bituminous membrane waterproofing system from PAZKAR or equivalent, composed of the following components:

- Preparation of reinforced concrete substrates, clean, dry, and free of dust
- Application of a cold-applied elastomeric bituminous mastic, such as PAZKAROL 18 or equivalent
- Installation of a vapor balancing bituminous membrane, composed of SBS polymer-modified bitumen and reinforced by non-woven polyester or fiberglass, 2,5 mm thick, such as PAZKAR VAPOGARD or equivalent
- Supply and installation of a hot-applied polymer-modified bitumen sealing layer, such as ELASTEX 105/25 or equivalent
- Installation of a second layer of bituminous membrane, composed of SBS polymer-modified bitumen with anti-root additives and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent
- Installation of a third layer of SBS polymer-modified bituminous membrane, reinforced with polyester and covered with a top coating of white mineral aggregates, 5 mm thick, such as POLYPAZ or equivalent

TS-584 Insulation:

TS-585 No insulation

TS-586 Installation shall be carried out in accordance with the supplier's instructions, relevant standards, and IS 1430/3 Particular care shall be taken at connections with upstands, water inlets, roof outlets, and other special elements.

TS-587 Expansion joints be executed in compliance with the technical approval for the selected product.

TS-588 Location.

- Waterproofing of the concrete slab, see architect's plans

8.10.2 Waterproofing of concrete upstands

TS-589 Installation of non-insulated waterproofing on upstands, in accordance with IS 1430/3 and the technical guidelines provided by the supplier for the selected system. The waterproofing will be applied on raised masonry elements and includes the following:

TS-590 Support: Concrete support (masonry) No thermal insulation

TS-591 Waterproofing system:

TS-592 Supply and installation of a bituminous membrane waterproofing system from PAZKAR or equivalent, composed of the following components:

- Preparation of reinforced concrete substrates, clean, dry, and free of dust
- Application of a triangular-shaped elastomeric bitumen joint, such as RALKA or equivalent, applied at corners between vertical and horizontal surfaces
- Application of a cold-applied elastomeric bituminous mastic, such as PAZKAROL 18 or equivalent
- Installation of a bituminous angle bracket, made of polymer-modified bituminous membrane with an anti-root additive and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent

TS-593 The backet shall be installed with a horizontal heel of at least 6 cm above the upper membrane level.

- Installation of a second layer of polymer-modified bituminous membrane with anti-root additives and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent
- Installation of a third layer of SBS polymer-modified bituminous membrane, reinforced with polymer and covered with a top coating of white mineral aggregates, 5 mm thick, such as POLYPAZ or equivalent

TS-594 Insulation:

Not applicable

TS-595 The top edge of the waterproofing strip must be protected by a device designated to prevent the ingress of runoff water.

TS-596 Installation shall be carried out in accordance with the supplier's instructions, relevant standards, and IS 1430/3 Particular care shall be taken at connections with upstands, water inlets, roof outlets, and other special elements.

TS-597 Expansion joints be executed in compliance with the technical approval for the selected product.

TS-598 Note:

- The waterproofing flashings will be raised against the walls and parapets up to the protective elements (flashing strip at the foot of the cladding, copings, etc., according to the architect's plans and sections)
- Includes all work required to ensure a perfect connection between the floor and the risers
- The work will include repairing the peripheral floor waterproofing around the skylight.

TS-599 Location.

- Waterproofing of the walls supporting the skylight, see architect's plans

8.10.3 Flashing strip

TS-600 Supply and installation of metal flashing to ensure a watertight seal between the wall substrate and the roof, in accordance with IS 1430/3, and relevant material standards.

- Flashing elements shall not exceed 2m in length
- Minimum overlap between flashing sections:10 cm
- Flashings shall be fixed at the top using waterproof fasteners (brackets or screws) spaced every 40 cm
- The bottom edge of the flashing shall be hemmed and terminated at least 30 mm above the finished horizontal surface
- Flashings inserted into masonry cut-outs (grooves) of at least 20 mm depth shall be sealed with mastic tape
- Corners shall be mitre-cut welded, with allowances made for thermal expansion
- Water tightness shall be verified by flow simulation tests prior to final acceptance by the architect

TS-601 Location.

- On the outskirts of the new slab, see architect's plans

8.10.4 Waterproofing strip under grated channel

TS-602 Supply and installation of a bituminous waterproofing strip beneath the grated channel drain, to ensure watertightness between the drainage element and the structural concrete surface.

- The membrane shall be a polymer-modified bituminous membrane, minimum thickness 4 mm, reinforced with polyester, such as POLYPLAST by Pazkar or equivalent
- The membrane shall extend at least 10 cm beyond each side of the channel footprint
- Application by torch-on method over primed concrete substrate using a compatible bituminous primer
- Ensure continuous sealing with adjacent waterproofing systems and proper treatment at joints and angles

- All work shall be carried out in accordance with the manufacturer's instructions and IS 1430/3.

TS-603 Location.

- Waterproofing strip under grated channel, see architect's plans

8.11 Rainwater system

8.11.1 Grated channel drain

TS-604 Supply and installation of drainage channels with polymer concrete grating or equivalent material, including a galvanized cast iron or steel frame and grate. Load class comply with the intended use, in accordance with EN 1433 (Adopted in Israel)

TS-605 The system shall include:

- Prefabricated drainage channel made of polymer concrete, PVC or HDPE, with male/female or sealed joint connection system,
- Grating in ductile iron or galvanized steel, featuring longitudinal or anti-slip slots, secured with mechanical locking or anti-theft system,
- Metal frame integrated into the channel body, designated to be embedded in surrounding concrete
- Minimum resistance class:
- B125 for pedestrian areas and sidewalks
- C250 for road shoulders and vehicle-accessible zones

TS-606 Installation procedure:

- Preparation of a stabilized bedding layer (minimum 250 kg/m³ density) or compacted sand as specified by the manufacturer
- Installation of the channel in alignment, ensuring a continuous water line with a level tolerance of ±5 mm,
- Application of concrete on sides and below the channels, DTU20 / IS 000 or the manufacturer's specifications,
- Fixation of gratings securely onto the frame, and verification of gravity flow towards the designated drainage points or the stormwater network
- Creation of appropriate waterproofing or expansion joints, depending on site configuration.

TS-607 Constraints and quality checks:

- Ensure continuous flow without stagnation, with a minimum longitudinal slope of 0.5%,
- Thoroughly clean the drainage system before final acceptance

TS-608 Location.

- On the outskirts of the new slab, see architect's plans

8.11.2 Copper rainwater systems

TS-609 Supply and installation of a complete copper rainwater drainage system, including vertical downpipes, elbows, junction boxes, manholes, end caps, and connection to the underground stormwater network

TS-610 All components shall comply with ISO 6594

TS-611 Materials:

- Natural or pre-patinated copper, with a minimum thickness of 0,6 mm

TS-612 The system shall include:

- Copper downpipes DN 80 to DN 150, selected based on hydraulic flow calculations, with sockets or jointed connections.
- 45° and 90° elbows, wall-mounted with appropriate brackets and fixing.
- Gutter outlets with copper adapters fittings
- Grated drains made of copper, with a minimum load class C250, in according with EN 124
- Terminal manhole, Ø 400 mm, with copper cover,

TS-613 Installation requirements:

- Pipes shall be installed vertically or horizontally on a rigid wall or structural support,
- Fixing by copper or brass clamps with sealing brackets, spaced according to pipe diameter and height
- Minimum slope of 1% for horizontal sections to ensure proper water flow
- Joints shall be sealed with rubber gaskets or bituminous mastic depending on the type of connection used
- Connection of the system to the rainwater downpipe in Room 6, as shown on plans

TS-614 Location:

- Rainwater drainage from channel, see architect's plans

TS-615

9 Room C - Concrete support structrure

9.1 Preparation of the supports

TS-616 Creation of roofs terraces supports, for reinforced concrete walls to support skylight Work includes:

- Marking and reserving openings in the existing waterproofing system
- Core drilling or slab cutting where required
- Construction of reinforced concrete bases (massif and upstands)
- Filling and finishing of any voids or recesses
- Preparation of the substrate for subsequent casting of concrete walls.
- Protection and repair of the waterproofing membrane around the intervention area

TS-617 Implementation:

TS-618 Mandatory coordination with the waterproofing contractor for all operations affecting the integrity of the waterproofing system

TS-619 Concrete to be reinforced, vibrated, and trowel-finished with a characteristic strength of C25/30 (or 350 kg/m³ cement dosage)

TS-620 Location.

- For the skylight's concrete support in Room C, see Structural Engineer's plans

9.2 Creation of concrete support wall

TS-621 Generalities:

TS-622 Execution of reinforced concrete structures on site casted reinforced concrete of sufficient sections to distribute the loads of the skylight in accordance with the Structural Engineer study.

TS-623 The work shall include all requirements necessary for the perfect implementation of the concrete, shaping of the steel, shoring, formwork, reservations, etc.

TS-624 The structures shall be executed in accordance with the structural plans of the Structural Engineer.

TS-625 Miscellaneous requirements:

TS-626 The Structural study will be drawn up in accordance with the requirements set out by:

- Eurocodes
- The construction rules are set out in Israeli Standards 118 and 4466
- Standard 18-305 for ready-mixed concrete

- As well as all technical specifications defining the rules of good practice in this field

TS-627 All voids shall be reserved in reinforced concrete structures for hoppers and various passages, including all entanglements.

TS-628 Hoppers larger than 2 dm² reserved for the passage of pipes and other items shall be filled in by the contractor at its own expense. Those of smaller dimensions shall be filled in at the expense of the contractor who reserved them.

TS-629 The materials used must be approved by the Structural Engineer.

TS-630 The formwork shall be constructed in accordance with best practice and shall allow for rough, smooth or neat formwork removal surfaces, as required and specified in these Technical Specifications Document

TS-631 List of reinforced structures:

TS-632 The following structures shall be constructed in reinforced concrete, without this list being exhaustive for all structures below

TS-633 All concrete structures intended to remain unfinished shall be particularly well cared for, as specified in the plans.

TS-634 No defects in planimetry, plumbness, angles, breaks, or lack of concrete will be accepted, and in the event of failure, the works will be destroyed and redone.

TS-635 The contractor shall perform all work without arguing errors, omissions, or contradictions with the plans to avoid performing the work in a workmanlike manner or requesting additional payments for the project in question.

TS-636 The bill of quantities shall include the supply of materials, installation, steel shaping, scaffolding, and the necessary reservations for finishing work, rebates, and in general all fasteners to be incorporated into the concrete elements.

TS-637 The work will be carried out in accordance with the structural plans provided by the Structural Engineer

TS-638 Location.

- Concrete support walls, see Structural Engineer's plans
- Concrete slab, see Structural Engineer's plans

9.2.2 Picking the existing surface for adhesion

TS-639 This clause specifies the technical requirements for the picking of existing surfaces to ensure optimal adhesion of new concrete structures

TS-640 The Contractor shall carry out the mechanical preparation of existing substrates by picking, scabbling, or similar surface treatment to create a mechanical key (rough profile) appropriate to the type of subsequent material to be applied.

TS-641 Accepted techniques for surface picking include:

- Manual chiselling or hacking for small areas or delicate substrates.
- Mechanical scabbling, bush hammering, or needle gunning for larger or harder surfaces.

TS-642 Location.

- Concrete supports wall for the skylight in Room C, see Structural Engineer's plans

9.2.3 Pocketing in concrete walls

TS-643 This clause specifies the technical requirements for the picking of existing surfaces to ensure optimal adhesion of new concrete structures

TS-644 The Contractor shall carry out the mechanical preparation of existing substrates by picking, scabbling, or similar surface treatment to create a mechanical key (rough profile) appropriate to the type of subsequent material to be applied.

TS-645 Accepted techniques for surface picking include:

- Manual chiselling or hacking for small areas or delicate substrates.
- Mechanical scabbling, bush hammering, or needle gunning for larger or harder surfaces.

TS-646 Pocket Formation Methods:

Pockets may be created by formed openings or lining cut-out into the wall

TS-647 Dimensions and Tolerances:

Pocket dimensions must match design drawings.

Tolerances: ±5 mm in all directions, unless otherwise specified.

TS-648 Placement:

Pockets must not reduce structural performance of the wall.

TS-649 Minimum clear spacing to reinforcement, edges, and other embedded items must be respected.

TS-650 Reinforcement around the pocket (stirrups, additional bars) must be installed per engineer's detail.

TS-651 Location.

- Concrete supports wall for the skylight in Room C, see Structural Engineer's plans

9.2.4 Concrete

TS-652 Cement:

Type CEM I or CEM II, conforming to EN 197-1 and recommendations of Structural Engineer

TS-653 Aggregates:

Clean, hard, well-graded, and conforming to EN 12620

TS-654 Maximum aggregates size: typically 16-20 mm for walls, unless otherwise specified

Mixing water:

TS-655 Clean, free of harmful impurities, conforming to EN 1008

TS-656 Admixtures:

Only approved admixtures (plasticizers, superplasticizers, retarders, etc) conforming to EN 934-2 are permitted based on concrete performance requirements

TS-657 Location.

- Concrete supports wall for the skylight in Room C, see Structural Engineer's plans

9.2.5 Galvanized steels

TS-658 Applicable standards:

TS-659 Galvanized steel reinforcement shall comply with S400D and S500C:

- Steel for the reinforcement of concrete B500B / B500C
- Israeli standard IS 4466 Part 3
- Eurocode 2 – Design of concrete structures (EN 1992-1-1)
- Project structural drawings and bar schedules.

TS-660 Supply & identification:

TS-661 Reinforcements shall be delivered as hot-dip galvanized steel bars, SII marked, and accompanied by mill and galvanizing certificates indicating:

- Chemical composition
- Mechanical properties
- Zinc coating thickness (minimum 85 μm unless otherwise specified)
- Compliance with Israeli standards

TS-662 Bars shall be clearly marked with manufacturer's identification, steel grade, batch reference, and galvanizing reference

TS-663 No substitution is permitted without prior written approval from the Structural Engineer.

TS-664 Storage & handling:

- Galvanized steel shall be stored off the ground on wooden sleepers or racks, protected from mud, oil, or standing water
- Care must be taken to avoid damage to the zinc coating during handling and transport
- In case of localized damage, repair of the coating shall be done using zinc-rich paint conforming to EN ISO 14657 or as approved by the Engineer.

TS-665 Placement and Installation:

- Reinforcements shall be placed accurately per structural drawings and tied with galvanized annealed wire
- Concrete cover shall be as indicated in the drawings, typically:
- 25–40 mm for walls depending on exposure class and fire rating
- Use of plastic or galvanized spacers/chairs is mandatory to maintain cover
- Rebar must be clean and free from loose rust, oil, or contaminants, with intact zinc coating at the time of concreting

TS-666 Location.

- Concrete supports wall for the skylight in Room C, see Structural Engineer's plans

9.2.6 Formwork

TS-667 Applicable Standards:

TS-668 The formwork system and execution must comply with:

- EN 13670 – Execution of concrete structures
- EN 12812 – Falsework – Performance requirements and general design
- Eurocode 2 (EN 1992-1-1) – Concrete structure design rules
- Local labour and safety regulations (scaffolding, work at height, etc.)
- Manufacturer's guidelines for proprietary systems

TS-669 Design and load resistance:

TS-670 Formwork must be designed to resist all loads applied during:

- Concrete pouring
- Vibration and compaction
- Worker and equipment weight

TS-671 Must ensure:

- Shape and dimension accuracy
- No deformation or leakage
- Smooth, clean surfaces

TS-672 Tolerances per EN 13670:

- Wall thickness: ±10 mm
- Verticality: ≤5 mm per meter, max 20 mm total deviation

TS-673 Assembly and Installation:

TS-674 Formwork shall be:

- Plumbed, levelled, and braced to ensure stability
- Assembled to ensure tight joints, preventing leakage of cement paste
- Fitted with chamfers (typically 20x20 mm) at all visible corners unless otherwise specified All inserts (sleeves, pipes, box-outs, etc.) must be positioned before concrete pouring

TS-675 Access and safety platforms must be integrated when working at height

TS-676 Stripping and Removal:

- Stripping shall only occur after concrete has gained sufficient strength Dismantling must avoid:
- Shocks or impacts on the concrete
- Pulling out of embedded parts
- Surface damage

TS-677 Location.

- Concrete supports wall for the skylight in Room C, see Structural Engineer's plans

9.3 Creation of composite floor slab

9.3.1 Steel profile UPN 180, incl. hardware

TS-678 Supply and installation of UPN 180 metal profiles made of S235JR steel in accordance with EN 10025-2, including all assembly and fastening accessories (hardware)

TS-679 UPN 180 profiles will be used to construct a collaborative metal form slab, in accordance with the construction plans and layout plan

- Hot-rolled IPE 140 profile, length according to plans.
- Surface treatment: galvanized

TS-680 Fittings including:

- Perforated mounting plates (thickness and perforation according to plans),
- Assembly angle brackets
- Threaded rods, bolts (minimum class 8.8)
- Washers and lock nuts
- Gussets or stiffeners if necessary
- Any connecting elements for load bearing or anchoring

TS-681 Implementation:

- Cutting, drilling, assembly, and welding in the workshop or on site, according to the execution plan.
- Implementation in accordance with IS 1225, IS 4466 and IS 1090
- Fixing to masonry using chemical anchoring or mechanical anchoring, depending on the forces to be absorbed.
- Checking that the structure is plumb and level before final anchoring.

TS-682 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.2 Steel profile IPE 140, incl. hardware

TS-683 Supply and installation of IPE 140 metal profiles made of S235JR steel in accordance with EN 10025-2, including all assembly and fastening accessories (hardware)

TS-684 IPE 140 profiles will be used to construct a collaborative metal form slab, in accordance with the construction plans and layout plan

- Hot-rolled IPE 140 profile, length according to plans.
- Surface treatment: galvanized

TS-685 Fittings including:

- Perforated mounting plates (thickness and perforation according to plans),
- Assembly angle brackets
- Threaded rods, bolts (minimum class 8.8)
- Washers and lock nuts
- Gussets or stiffeners if necessary

- Any connecting elements for load bearing or anchoring

TS-686 Implementation:

- Cutting, drilling, assembly, and welding in the workshop or on site, according to the execution plan.
- Implementation in accordance with IS 1225, IS 4466 and IS 1090
- Fixing to masonry using chemical anchoring or mechanical anchoring, depending on the forces to be absorbed.
- Checking that the structure is plumb and level before final anchoring.

TS-687 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.3 Chemical anchors

TS-688 Supply and installation of chemical anchors with galvanized steel threaded rods

TS-689 The chemical anchors will be used to fix UPN 180s to load-bearing walls made of concrete or stone. Includes:

- Drilling to the appropriate diameter
- Cleaning by blowing and brushing
- Injection of resin,
- Installation of threaded rods (class 8.8 min.),
- Allowing for setting time before loading.

TS-690 Implementation:

TS-691 Compliant with manufacturer's specifications (ETA and ICC-ES) and SI 118

TS-692 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.4 Steel connectors

TS-693 Supply and installation of galvanized steel threaded rods for connections or fastenings in reinforced concrete elements

TS-694 Description:

- Hot-dip galvanized steel (Z275 minimum),
- Fastening by chemical anchoring or mechanical doweling depending on the forces to be absorbed,
- Creation of recesses and localized perforations
- Corrosion protection provided by galvanization and/or additional covering if in an exposed area.

TS-695 Installation:

TS-696 Compliant with the manufacturer's specifications and the structural detail plan

TS-697 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.5 Metal Decking Hi Bond A55/P600

TS-698 Supply and installation of Hi-Bond A55 composite steel decking, rib spacing 600 mm (P600), for reinforced concrete slab support

TS-699 Galvanized steel ribbed tray compliant with standard SI 504, thickness ≥ 0.75 mm, Z275 galvanization. Installation on load-bearing frame with longitudinal and transverse overlap in accordance with SI 1225 and SI 4466

TS-700 Mechanical fastening with self-drilling screws or powder-actuated fasteners on metal structure. Compliant with manufacturer's specifications and applicable regulations.

TS-701 The mesh sheets and additional reinforcement are laid out according to the plan. Temporary shoring if necessary, depending on span and loads.

TS-702 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.6 Galvanized steels

TS-703 Applicable standards:

TS-704 Galvanized steel reinforcement shall comply with S400D and S500C:

- Steel for the reinforcement of concrete B500B / B500C
- Israeli standard IS 4466 Part 3
- Eurocode 2 – Design of concrete structures (EN 1992-1-1)
- Project structural drawings and bar schedules.

TS-705 Supply & identification:

TS-706 Reinforcements shall be delivered as hot-dip galvanized steel bars, SII marked, and accompanied by mill and galvanizing certificates indicating:

- Chemical composition
- Mechanical properties
- Zinc coating thickness (minimum 85 μm unless otherwise specified)
- Compliance with Israeli standards

TS-707 Bars shall be clearly marked with manufacturer's identification, steel grade, batch reference, and galvanizing reference

TS-708 No substitution is permitted without prior written approval from the Structural Engineer.

TS-709 Storage & handling:

- Galvanized steel shall be stored off the ground on wooden sleepers or racks, protected from mud, oil, or standing water
- Care must be taken to avoid damage to the zinc coating during handling and transport
- In case of localized damage, repair of the coating shall be done using zinc-rich paint conforming to EN ISO 14657 or as approved by the Engineer.

TS-710 Placement and Installation:

- Reinforcements shall be placed accurately per structural drawings and tied with galvanized annealed wire
- Concrete cover shall be as indicated in the drawings, typically:
- 25–40 mm for walls depending on exposure class and fire rating
- Use of plastic or galvanized spacers/chairs is mandatory to maintain cover
- Rebar must be clean and free from loose rust, oil, or contaminants, with intact zinc coating at the time of concreting

TS-711 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.7 Concrete

TS-712 Cement:

Type CEM I or CEM II, conforming to EN 197-1 and recommendations of Structural Engineer

TS-713 Aggregates:

Clean, hard, well-graded, and conforming to EN 12620

TS-714 Maximum aggregates size: typically 16-20 mm for walls, unless otherwise specified

TS-715 Mixing water:

Clean, free of harmful impurities, conforming to EN 1008

TS-716 Admixtures:

Only approved admixtures (plasticizers, superplasticizers, retarders, etc) conforming to EN 934-2 are permitted based on concrete performance requirements

TS-717 Location.

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.8 Surfacing

TS-718 The contractor must resurface the freshly poured concrete slab to obtain a surface suitable for its end use: waterproofing substrate.

TS-719 Execution:

TS-720 Surface must be leveled immediately after placing and compacting concrete. Finishing operations shall begin after bleeding water has evaporated.

TS-721 Troweling or floating must be done:

- By hand or with power trowel, depending on area size
- In multiple passes as needed to close pores and level surface Edges and joints must be neatly detailed and finished.

TS-722 Location:

- Composite floor slab in Room C, see Structural Engineer's plans

9.3.9 Filling openings with concrete blocks

TS-723 The contractor shall carry out the temporary closure of new openings (windows in the masonry supports the skylight) using hollow or solid concrete blocks, in accordance with the construction drawings, the work shall include:

- Supply and delivery of all required materials to the roof level
- Preparation of the opening edges (cleaning, levelling, moistening).
- Construction of a masonry base using standard concrete blocks (dimensions and strength as per plans).
- Mechanical anchoring or bonding of new blocks to existing structure (e.g. reinforcing bars, chemical anchors or bonding mortar).
- Laying of the blocks with controlled cement mortar
- Installation of horizontal and/or /vertical ties or stiffness, if specified the structural design
- Careful filling and alignment of the openings
- Finish to a level ready for waterproofing works

TS-724 Location.

- All openings in the concrete support of the skylight in Room C, see Structural Engineer's plans

9.4 Waterproofing

9.4.1 Waterproofing of standard concrete surfaces

TS-725 Installation of non-insulated waterproofing on common parts, in accordance with IS 1430/3 and the technical guidelines provided by the supplier for the selected system. The waterproofing will be applied on concrete slabs and includes the following:

TS-726 Support: Concrete support (masonry)

No thermal insulation

Slope between 0 to 5%

TS-727 Waterproofing system:

TS-728 Supply and installation of a bituminous membrane waterproofing system from PAZKAR or equivalent, composed of the following components:

- Preparation of reinforced concrete substrates, clean, dry, and free of dust
- Application of a cold-applied elastomeric bituminous mastic, such as PAZKAROL 18 or equivalent
- Installation of a vapor balancing bituminous membrane, composed of SBS polymer-modified bitumen and reinforced by non-woven polyester or fiberglass, 2,5 mm thick, such as PAZKAR VAPOGARD or equivalent
- Supply and installation of a hot-applied polymer-modified bitumen sealing layer, such as ELASTEX 105/25 or equivalent
- Installation of a second layer of bituminous membrane, composed of SBS polymer-modified bitumen with anti-root additives and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent
- Installation of a third layer of SBS polymer-modified bituminous membrane, reinforced with polyester and covered with a top coating of white mineral aggregates, 5 mm thick, such as POLYPAZ or equivalent

TS-729 Insulation:

No insulation

TS-730 Installation shall be carried out in accordance with the supplier's instructions, relevant standards, and IS 1430/3 Particular care shall be taken at connections with upstands, water inlets, roof outlets, and other special elements.

TS-731 Expansion joints be executed in compliance with the technical approval for the selected product.

TS-732 Location.

- Waterproofing of the concrete slab, see architect's plans

9.4.2 Waterproofing of concrete upstands

TS-733 Installation of non-insulated waterproofing on upstands, in accordance with IS 1430/3 and the technical guidelines provided by the supplier for the selected

system. The waterproofing will be applied on raised masonry elements and includes the following:

TS-734 Support:

Concrete support (masonry) No thermal insulation

TS-735 Waterproofing system:

Supply and installation of a bituminous membrane waterproofing system from PAZKAR or equivalent, composed of the following components:

- Preparation of reinforced concrete substrates, clean, dry, and free of dust
- Application of a triangular-shaped elastomeric bitumen joint, such as RALKA or equivalent, applied at corners between vertical and horizontal surfaces
- Application of a cold-applied elastomeric bituminous mastic, such as PAZKAROL 18 or equivalent
- Installation of a bituminous angle bracket, made of polymer-modified bituminous membrane with an anti-root additive and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent

TS-736 The backet shall be installed with a horizontal heel of at least 6 cm above the upper membrane level.

- Installation of a second layer of polymer-modified bituminous membrane with anti-root additives and polyester reinforcement, 5 mm thick, such as POLYPLAST or equivalent
- Installation of a third layer of SBS polymer-modified bituminous membrane, reinforced with polymer and covered with a top coating of white mineral aggregates, 5 mm thick, such as POLYPAZ or equivalent

TS-737 Insulation: Not applicable

TS-738 The top edge of the waterproofing strip must be protected by a device designated to prevent the ingress of runoff water.

TS-739 Installation shall be carried out in accordance with the supplier's instructions, relevant standards, and IS 1430/3 Particular care shall be taken at connections with upstands, water inlets, roof outlets, and other special elements.

TS-740 Expansion joints be executed in compliance with the technical approval for the selected product.

TS-741 Note:

- The waterproofing flashings will be raised against the walls and parapets up to the protective elements (flashing strip at the foot of the cladding, copings, etc., according to the architect's plans and sections)
- Includes all work required to ensure a perfect connection between the floor and the risers
- The work will include repairing the peripheral floor waterproofing around the skylight.

TS-742 Location.

- Waterproofing of the walls supporting the skylight, see architect's plans

9.4.3 Flashing strip

TS-743 Supply and installation of metal flashing to ensure a watertight seal between the wall substrate and the roof, in accordance with IS 1430/3, and relevant material standards.

- Flashing elements shall not exceed 2m in length
- Minimum overlap between flashing sections:10 cm
- Flashings shall be fixed at the top using waterproof fasteners (brackets or screws) spaced every 40 cm
- The bottom edge of the flashing shall be hemmed and terminated at least 30 mm above the finished horizontal surface
- Flashings inserted into masonry cut-outs (grooves) of at least 20 mm depth shall be sealed with mastic tape
- Corners shall be mitre-cut welded, with allowances made for thermal expansion
- Water tightness shall be verified by flow simulation tests prior to final acceptance by the architect

TS-744 Location:

- On the outskirts of the new slab, see architect's plan.