

## **ANNEX 1 – TECHNICAL SPECIFICATIONS**

HELLENIC ORGANIZATION FOR STANDARIZATION = ELOT

### **A. NATIONAL TECHNICAL SPECIFICATIONS / HELLENIC ORGANIZATION STANDARIZATION - ELOT SPECIFICATIONS**

- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-02-02-01-00  
GENERAL EXCAVATIONS OF ROAD AND HYDRAULIC WORKS
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-01-03-01  
EXCAVATION OF UNDERGROUND NETWORK TRENCHES
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-01-03-02  
BACKFILLING OF UNDERGROUND NETWORK TRENCHES
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-02-08-00-00  
DEALING WITH PUBLIC UTILITIES NETWORKS DURING EXCAVATIONS
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-10-01-00  
CONSTRUCTION SITE WATER PUMPING
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-10-01-00  
BITUMINOUS PRE-COATING
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-05-03-11-04  
CLOSED TYPE BITUMINOUS LAYERS
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-06-02-02  
SEWERAGE NETWORKS FROM U-PVC PIPES
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-06-06-02  
RAINWATER AND SEWAGE NETWORKS FROM FIBER CEMENT PIPES
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-07-01-04  
GRATES FOR WATER COLLECTION – COVERS OF MALLEABLE CAST IRON
- HELLENIC ORGANIZATION FOR STANDARIZATION TECHNICAL SPECIFICATION 1501-08-06-08-06  
PREFABRICATED CONCRETE WELLS

### **B. OTHER TECHNICAL SPECIFICATIONS – Part I**

#### **Technical Specification 1: SIDE SUPPORT**

##### 1. Subject

This Technical Specification refers to the auxiliary structures of links for the support of the sides of the trench and the excavation of technical works in cases where there is a risk of collapse of the sides.

##### 2. Metal diaphragms

The retaining of the sides of trenches and all kinds of excavations will be provided where necessary due to loose soils, using twin self-supporting metal diaphragms of Krings type or other equivalent type. The

Contractor is obliged to use diaphragms of recognized industrial origin and not improvised and to install them in accordance with safety rules.

The density of the links is proposed by the Contractor and approved by the Supervising and Contracting Authorities. It is noted that in case of need for side links, the Contractor must indicate this need to the Supervisor and in case of danger to proceed without prior arrangement to this work.

### 3. Measurement and payment

The measurement and payment of slope retainings with metal diaphragms when they are sporadic is included in the price of excavations, while when they are systemic and long they are measured on the basis of the square footage in contact with the ground and are paid according to the conventional prices.

## **Technical Specification 2: DRAINAGE PIPES FOR RAINWATER AND SEWAGE FROM PLASTIC PIPES OF STRUCTURED WALL**

### 1. Subject

This Technical Specification refers to the pipes and special sewerage blocks from plastic pipes of structured wall with smooth inner and corrugated external surface according to the HELLENIC ORGANIZATION STANDARDIZATION ELOT EN 13476 and perforated drainage pipes of structured wall with smooth inner and corrugated external surface according to HELLENIC ORGANIZATION FOR STANDARDIZATION ELOT EN ISO 9969.

### 2. General

The planned works for the construction of structured wall plastic sewage pipes are summarized as follows:

- The supply of pipes and special pieces and all kinds of tests in the factory before receipt.
- All loading, unloading and transportation of pipes and special pieces from the manufacturing plant to the assembly site and then from there to the installation site.
- The laying and connection of pipes and special pieces inside the trench.
- The process of backfilling the trench of the pipeline.
- All kinds of acceptance tests of manufactured pipelines.

All the aforementioned works will be carried out in accordance with the details set out in this Technical Specification.

For all other works required for the construction of the sewage network, such as excavation and refilling of trenches, loading and unloading and transportation of excavated products, construction of sand substrate, construction of wells, etc., the NATIONAL TECHNICAL SPECIFICATIONS applies and for those works that are not provided for therein, the corresponding Technical Specifications of this Annex apply.

### 3. Quality, characteristics of pipes and special pieces – receipt of materials

The quality, characteristics, and acceptance tests at the factory of the pipes and special parts of the series specified in the design drawings will fully comply with the standards HELLENIC ORGANIZATION FOR

STANDARIZATION EN 13476 and HELLENIC ORGANIZATION FOR STANDARIZATION EN ISO 9969. The manufacturer according to this standard is the factory, from which the Contractor will obtain the plastic pipes.

It is noted that the pipes that will be incorporated in this project must be certified with a Certificate of Conformity by EVETAM S.A. based on Government Gazette B'3346 / 14-12-12 and generally meet all the stated requirements in this.

#### 4. Test standards

- HELLENIC ORGANIZATION FOR STANDARIZATION EN ISO 9969 Thermoplastics pipes – Determination of ring stiffness
- HELLENIC ORGANIZATION FOR STANDARIZATION EN 744 Plastic pipe and pipeline systems – Thermoplastic pipes – Test of resistance to external shocks by the clock method
- HELLENIC ORGANIZATION FOR STANDARIZATION EN 9967 Plastic pipes – Determination of creep ratio
- HELLENIC ORGANIZATION FOR STANDARIZATION EN 3126 Plastic pipe systems – Plastic components – Dimensional determination

The pipelines and special pieces of the same material will be delivered to the Contractor at the factory, after all mandatory and any optional acceptance tests that have been deemed appropriate, as defined in the HELLENIC ORGANIZATION FOR STANDARIZATION EN standards, have been carried out. The Supervising Authority has the right to attend the product control tests with its legally authorized representative. If a representative of the Supervision Authority is not present at the tests, the pipe manufacturer is obliged to issue to the Supervision Authority a certificate certifying that all pipes and fittings have passed the above tests.

It is clarified that the presence of a representative of the Supervision Authority at the acceptance tests of pipes and fittings or the granting of the relevant certificate by the manufacturer in accordance with the above, does not prejudice the final acceptance of the installed piping on site by the Supervision Authority.

#### 5. Pipe dimensions

The dimensions of the pipes will comply with what is mentioned in the standard HELLENIC ORGANIZATION FOR STANDARIZATION EN 13476-3. The standardization of the nominal diameter of pipes (DN) is done by the inner diameter (DN/OD).

#### 6. Transportation and storage of materials

The handling and storage of pipes and special pieces will be done with care to avoid damage. The transport vehicles shall be of such length that the pipes do not protrude from the truck.

Cranes or other lifting machinery will be used for loading and unloading. In no case is landing by tipping allowed. It is forbidden to use wire rope or chains for handling pipes. Handling must be with straps.

The pipes shall be stored in fenced areas and placed in such an arrangement (e.g. pyramid arrangement) to avoid distortions and deformations due to overlying weight. Each diameter will be stacked separately.

Until their installation, the pipe connection pieces will remain in their packaging. The following must be avoided:

- a) The uneven temperature distribution peripherally in the cross-section, as it may cause distortion or buckling of the pipe.
- b) Axial or transverse loading in so far as it may cause deformation (widening) of the diameter.
- c) Dragging, dropping, or stacking on rough surfaces. If pipes are loaded and unloaded with ropes or chains, they shall be adequately protected against abrasions and scratches.
- d) Excessive loading of stored pipes (e.g. incorrect stacking). The right perspective is stacking at a height of up to 1.5m. The bottom layer will rest on a flat clean surface and along the entire length of the pipes.

When storing pipes of different rows and diameters, the most rigid ones will be arranged at the bottom of the stack.

If pipes have pre-formed ends (e.g. flanged pipes), these ends will protrude. The ends of pipes treated for connection will be protected from damage.

The trucks used to transport the pipes will have a body with smooth surfaces, without sharp objects protruding that could damage the pipes.

### 7. Laying pipes in the trench

For proper placement of the pipe in a trench, the following instructions must be followed:

- a) The depth of the trench should be such as to allow a minimum of 10 cm of sand to be laid on the bottom, on which the pipes will be laid (for sewer pipes).
- b) Sharp or very large stones must have been removed from the bottom of the trench.
- c) The choice of granulometry of materials should be made with the criterion of easy penetration into the grooves of the pipe. The base and protective backfill must consist of the above-mentioned materials, which are laid in successive layers followed by compaction up to a height of 30 cm above the crown of the pipe.
- d) Particular attention should be paid to the compaction of the backfill on the side of the pipeline. Compaction should be carried out after the backfill exceeds half the diameter of the pipeline to prevent it from rising and therefore changing the slope of the pipeline and continue backfilling and compaction as described in the previous paragraph. Then the pit can be filled with the excavation materials, after the sharp and very large stones have been removed. The degree of compaction of the backfill required is equal to or greater than 90% according to Proctor (Optimum).
- e) In case of aquifer existence, the laying of sewer pipes should be carried out after the removal of water and their backfilling should be done to avoid the phenomenon of buoyancy.
- f) It is recommended to use mechanical means, such as the installation of a board of suitable dimensions for the equal distribution of loads and the avoidance of damage to the ends of the pipes.
- g) Particular attention should be paid to the phenomenon of expansion of pipes when they are placed in an environment of high temperatures. In this case, it is necessary to coat the pipes with partial backfilling.

### 8. Pipe connection

The pipes are connected to each other by a coupling and rubber ring. For sewer pipes from DN/OD 250mm to DN/OD 1200mm and from DN/ID 300mm to DN/ID 800mm the ring shall be placed in the first groove and in pipes from DN/OD 160mm to DN/OD 200mm the ring shall be placed in the second groove or according to the manufacturer's instructions.

After the installation of the rubber ring to facilitate the connection, the coupling to be connected is internally coated with liquid soap. Soap coating of the rubber ring should be avoided in order not to cause adhesion of sand or soil microparticles, which may affect the tightness of the connection. When joining pipes of large diameters it is recommended to use mechanical means. In such cases, it is necessary to protect the free end of the pipe by placing a board of suitable dimensions to evenly distribute the loads and avoid damage to the pipe.

The couplers must be placed in their correct position to ensure the smooth flow inside the network (up to their inner ring).

Note: Especially for sewage networks in cases where there is a high-water table, it is recommended to use a second rubber ring, which will be made of special materials that swell upon contact with water (hydrophilic) thus ensuring the absolute two-way tightness of the network or any other element that will ensure the absolute tightness of the connection.

### 9. Water-tightness Tests

Tests are carried out on the pipeline according to ELOT EN 1277 Plastic pipe systems – Thermoplastic pipe systems for underground non-pressure applications – Methods for testing the tightness of elastomeric joints of sealing ring type.

### 10. Quality control requirements for receipt

- a) Check of consignment notes of incorporated materials.
- b) Presentation of a Certificate of Conformity or its absence, control of the corresponding Audit Certificates by EVETAM S.A. in accordance with the provisions of Government Gazette B´3346 / 14-12-12.
- c) Check the horizontal and altitude placement of pipes and their wiring according to the approved study.
- d) Check of pressure test practices.
- e) Inspection of the installation according to the drawings of the approved study, in order to determine whether all the required components have been installed and whether the slopes have been accurately observed (in the case of gravity networks).
- f) Parts that display damage, distortions or corrosion will not be accepted and an order will be given to replace them at the expense of the Contractor.

### 11. Final cleaning and inspection

Before the project is accepted by the Supervising and Contracting Authority, the entire pipeline system, including manholes, must be cleaned to remove possible sediments that have entered the network, so that the pipelines are completely clean and free of obstructions. Before receipt, the network will be inspected by the Supervising Authority.

### 12. Measurement and payment

The measurement of the pipelines for each diameter is based on the current meters (axial length) of the pipeline, which were satisfactorily constructed and in accordance with the terms of this Technical Specification and Study and accepted by the Contracting Authority. The length is measured from the inner side of one shaft to the inner side of the next shaft.

The payment will be made for the pipeline lengths per nominal diameter measured in accordance with the above and at the contractual unit price which constitutes full compensation of the Contractor for all costs of supply of pipes, installation and connection of pipes to the trench (arrangement of the trench, opening of nests, widening of the sides of the trench for direct connection of pipes and special pieces), as well as the costs of duct tightness tests, including the cost of water supply.

The price of the pipelines does not include encapsulation with sand or quarry crushing material, which are pre-calculated and paid separately based on the relevant financial offer.

### **C. OTHER TECHNICAL SPECIFICATIONS – Part II**

#### **A. Earthworks**

##### **A1. Excavation of underground network trenches in earthy or semi-rocky soil. Excavation depth up to 4.0 m**

- With a bottom width of up to 3.00 m
- With lateral deposition of excavation products.
- With the transport of excavation products

Excavation of underground network trenches in earthy or semi-rocky terrain, including the excavation of any existing asphalt layers, in a residential area or in the range of occupation of a road axis under traffic, by any means (mechanical means with or without manual assistance) on dry or with groundwater (with a calm or degraded level by pumping), according to the EIB 08-01-03-01 "Excavation of underground network trenches".

The cutting of asphalt layers or existing concrete layers must be performed with an asphalt cutter.

The use of pumps is not particularly paid, both during excavation and during the execution of works within the trench and until their completion, unless otherwise provided for in the study.

The price includes sporadic retaining of the sides of the trench (if required), shaping the sides and bottom of the trench in the required cross-sections in such a way that it is possible to use formulas for laying concrete, bounce, depending on the way and means of excavation, as well as any necessary working floors. Finally, the price includes any kind of side transport (horizontal or vertical).

Sporadic are considered the supports of the sides whose length does not exceed 2,00 m in total, per 20,0 m axial length of trench. The special retaining structures shall be measured in particular, over their entire application area, in accordance with the provisions of the study.

Excavations shall be measured per depth zone (up to 4,00 m).

Price per cubic meter (m<sup>3</sup>) of trench, based on the payment lines determined by the present document, depending on the width of the seabed, the depth of the trench and the management of the excavated products.

## A2. Restoration of single-layer asphalt pavements

- Restoration of asphalt pavements with asphalt layers of average thickness of 5 cm

For the works of complete restoration of one square meter of dismantled asphalt pavement, namely:

- Laying and compaction of paving material with quarry aggregates, in layers up to 15 cm thick and with a total thickness equal to the pre-existing one.
- Application of asphalt pre-coating.
- Asphaltic base layer with asphalt mixture, hot-prepared in a permanent installation, of a thickness of 50 mm.
- Laying and compaction of hot produced asphalt mixture in a permanent installation, of a total thickness equal to the pre-existing layer of concentrated thickness up to 50 mm.
- Application of asphalt adhesive coating in case of application of a double asphaltic layer.

This includes the supply and transport on site of all incorporated materials, the taking of measures for the required traffic arrangements and the employment of personnel, equipment and means to carry out the works, as well as the collection and removal of any surplus materials and the cleaning of the road surface using a mechanical sweeper after the completion of the works.

## A3. Asphaltic Pre-coating

Pre-coating of surface without asphalt with asphaltic solution type ME-0 or with acidic asphaltic emulsion, regardless of the extent and shape of the surface, in outdoor and underground works, according to EIB 05-03-11-01 "Asphaltic pre-coating".

The unit price includes:

- The supply of asphalt, oil and any required antihydrophilic product and their transport to the site of the project from any distance.
- The handling of materials and the preparation of asphaltic solution (heating, storage, storage, etc.).
- Cleaning of the surface to be pre-coated with a mechanical sweeper and manual assistance.
- Transportation and diffusion of asphaltic solution or emulsion with a self-propelled asphalt distributor (Federal).
- Reheating of the solution before diffusion (when required),
- The possible laying of an inert coating material with the value of its production or supply and transport to the place of laying.

## A4. Traffic related asphaltic pre-coating

Construction of asphaltic traffic related layer, in underground and outdoor works, regardless of the extent and form of the surface, with asphaltic mixture prepared hot in a permanent installation with crushed aggregates of quarry type, AS 12,5 or AS 20, according to the National Technical Specifications 05-03-11-04 "Asphaltic layers of closed type asphalt concrete".

The unit price must include:

- The production or supply and transport of appropriate aggregates and asphalt until the production facility of the asphalt mix.
- The production of asphaltic mixture, according to the approved composition.
- The transport of the hot asphaltic mixture on site, its laying with a finisher.

- The stagnation of the means of transportation.
- The rolling of the asphaltic mixture (initial, intermediate-intensive and final), in order to obtain the prescribed surface texture and smoothness.
- The complete compaction and thorough leveling of longitudinal and transverse joints to eliminate surface traces.

Unit price must include the value of incorporated asphalt.

A5. Backfilling of underground networks with excavated products, with special compaction requirements

Backfilling of underground network trenches in residential areas or in the road crossing zone, in layers up to 30 cm thick with suitable project excavation products deposited alongside or borrowed soil transferred on site, according to the study and the National Technical Specifications 08-01-03-02 "Refilling of underground network trenches".

The unit price includes lateral transport of deposited or presented products, disposition in the trench by mechanical means and manually (where necessary), layering up to 30 cm thick, wetting (by supplying and transporting water on site) and compaction with vibrating compactors of dimensions proportional to the width of the trench, in order to obtain a degree of concentration corresponding to a dry apparent density equal to at least 95 % of that obtained in the laboratory during the modified Proctor test (Proctor Modified by Hellenic Organization for Standardization EN 13286-2).

A6. Backfilling of underground network trenches with graded quarry crushed gravel

For total backfill thickness up to 50 cm

Backfilling of underground network trenches in residential areas or in the road crossing zone, in layers up to 30 cm thick, with graduated crushed quarry gravel, according to the typical cross-sections of the study and the National Technical Specifications 08-01-03-02 "Refilling of underground network trenches".

The unit price includes the supply and transport on site of graduated quarry crucible material, side transport, disposition in the trench by mechanical means and manually (where required), layering up to 30 cm thick, wetting (by supplying and transporting water on site) and compaction with vibrating compactors of dimensions proportional to the width of the trench, in order to obtain a degree of concentration corresponding to a dry apparent density equal to at least 95 % of the density obtained in the laboratory in the modified Proctor test (Proctor Modified by Hellenic Organization for Standardization EN 13286-2).

Price per cubic meter (m<sup>3</sup>) of concentrated backfill volume, based on the payment lines of the trench defined in the study.

A7. Layers and encapsulation of pipes with quarry sand

Layers and encapsulation of pipes in a trench with sand from a quarry, according to the typical cross-sections of the study and the National Technical Specifications 08-01-03-02 "Refilling of underground network trenches".

The unit price must include:

- The supply and transport of quarry sand on site.
- The approach, disposition and laying of the material in the trench.

- The leveling of the bearing layer and the printing or slight compaction of the encapsulation layer so that it completely surrounds the pipes, with special care to avoid damage to the pipeline.

Price for one cubic meter (m3) of backfilling as above, according to the payment lines provided by the study (typical pipeline cross-sections)

#### A8. Sanitizing layers with gravel materials

Soil sanitation of the foundation of various structures at any location of the project (including sanitization of pipe ditch bottoms) with gravel materials in layers, thickness, granulometric gradation and degree of compaction according to the project study.

The unit price includes the supply and transport on site, from any distance, of gravel materials, their laying and compaction using appropriate mechanical equipment.

Price per cubic meter (m3). Measurement by taking initial and final cross-sections.

#### A9. Operation of pumping units

Operation of portable or mobile construction site pumping units for the drainage of incoming or groundwater and the pumping of sewage during the execution of the various works of the project, if this is provided for in the study or after a written order of the Contracting and Supervising Authorities and otherwise in accordance with the National Technical Specifications 08-10-01-00 "Construction site water pumping" and 08-10-02-00 "Muck - Sewage Pumping".

Unit rates must include:

- a) The presentation at the place of execution of the pumping unit of suitable power for the respective head and flow rate required and the corresponding piping, devices and accessories.
- b) The cost of fuel or electricity
- c) Installation, supervision of operation, fuel supply and maintenance of the pump and piping
- d) The opening of a temporary ditch for the extraction of pumped water to an existing recipient
- e) The movements of the pump and piping according to the work schedule
- f) The staggers of the complex for any reason

Price per hour (h) of operation of the pumping unit carried out after approval by the Contracting and Supervising Authorities.

## **B. Concrete Constructions**

#### B1. Production, transportation, placing, compaction and maintenance of concrete

Production or supply, on-site transport, laying and compaction of concrete of any category or quality, in accordance with the provisions of the Hellenic Organization for Standardization EN 206-1, of the Concrete Technology Regulation and Greek Regulation of Reinforced Concrete (provided that they do not conflict with the provisions of the Hellenic Organization for Standardization EN 206-1), as well as the requirements of the Study.

The price must include:

- a) The supply, transportation from any distance to the site of the project, of concrete, in the case of factory concrete, or the supply, loading and unloading of all the materials required (aggregates, cements, water) for the preparation of concrete, if the concrete is prepared on site (construction site concrete), the drips of cars transporting aggregates and concrete, the preparation of the mixture and the transport of the concrete to the laying site.

It is noted that the price per category of concrete includes the cost of the required quantity of cement to achieve the predicted characteristics (strength, workability, etc.) under the applied granulometric gradation of aggregates depending on the case. In no case is the amount of cement incorporated in concrete particularly measured.

The required granulometric grading of aggregates and the cement content to achieve the required characteristic strength of concrete is determined in the laboratory at the expense of the Contractor.

- b) All additives (except fluids) provided for in the approved composition study, as the case may be, shall be measured separately.
- c) The use of mass and/or surface vibrators and the configuration of the upper level (final or temporary) of the concreted elements, according to the specifications of the project design.
- d) The drip of the concrete transport vehicles (barrels), the transition on site, the set-up and return of the concrete pump, as well as the collection, loading and removal of any overflows or excess concrete that has been presented at the concreting site.
- e) Additional floor configuration processing of special requirements (e.g. industrial flooring) is not included.

The work will be carried out in accordance with the following National Technical Specifications:

- 01-01-01-00: Production and transport of concrete
- 01-01-02-00: Concrete laying and compaction
- 01-01-03-00: Concrete maintenance
- 01-01-04-00: Concrete production sites
- 01-01-05-00: Vibratory concrete condensation
- 01-01-07-00: Concreting of bulky structures

Please note that it is strictly forbidden to add water to the concrete on site. It is also forbidden to use concrete after 90 minutes of mixing, unless retardant additives are applied based on a special composition study.

## B2. Typical control shafts

Complete construction of a typical control shaft, at any location of the project and regardless of the depth of the pipeline from the ground surface, in accordance with the applicable National Technical Specifications per individual scope of works.

The unit price includes:

- Any research areas required to identify pipelines and networks.
- The required excavations in any way (mechanical means or hands), in any kind of soil, with any required retaining of the sides of the trench, as well as the loading and unloading of surplus excavation products and their transport at any distance.
- The required demolitions – dismantling.

- Any pumping required.
- The required sanitizing layers of the shaft
- The unreinforced and reinforced concrete structures that make up the shaft (concrete of any category, reinforcement, formwork, admixtures), according to the plans of the Study.
- The required internal configurations of the shaft, according to the plans of the Study
- The insulation of the outer sides of the shaft with asphaltic coating.
- The supply and installation of the planned cast iron grades and the manhole cover, according to the plans of the Study.
- The construction of a drainage arrangement of the shaft to a suitable recipient (pipe, special pieces, connection, and encapsulation of pipe).
- The supply and installation of a ventilation pipe (when required).
- The backfilling of the remaining gap of the trench with crushed material.
- The restoration of the surface of the trench to its original condition (road deck or pavement)
- Any other work or individual construction for the completion of the shaft, according to the plans of the Design.

### B3. Steel concrete reinforcement

Supply and transportation on site of concrete reinforcement steel of all kinds of structures, cross-section, form and category according to the study, its configuration according to the study, approach to the integration site by any means and its placement according to the reinforcement drawings. Execution of works according to the National Technical Specifications 01-02-01-00 "Steel concrete reinforcement".

The installation of the reinforcement will be done only after the receipt of the formwork or the concrete bearing surface (e.g. reinforced floor substrate, etc.).

Steel concrete reinforcement is measured in kilograms, per reinforcement category (steel B500A, B500C and welded mesh) based on detailed Reinforcement Tables.

If these tables are not included in the approved design of the project, they will be prepared by the Contractor and will be submitted to the Supervising Authority for inspection and approval before the start of the installation of the reinforcement.

The Tables will be prepared based on the drawings of the study and will include in detail the dimensions of the bars (spreads), the diameters, the mounting positions and the overcover lengths, the weights per running meter per diameter, the individual and total lengths of the bars, the partial weights per diameter and the total weight. The above Reinforcement Tables, upon receipt of the reinforcement, will be signed by the Contractor and the Supervising Authority and will constitute the measurement of the reinforcements.

The weight of reinforcement bars per running meter will be calculated on the basis of the following Table of the Regulation of steel technology KTX-2008, which is set out below. Under no circumstances is it acceptable to determine the unit weight of bars on the basis of a balance sheet.

Nom. diameter (mm)	Field of application					Nom. cross section (mm <sup>2</sup> )	Nom. mass/ metre (kg/m)
	Bars	Coils and aligned products		Electro-welded mesh and trusses			
		B500C	B500A	B500C	B500A		
5,0		√		√		19,6	0,154
5,5		√		√		23,8	0,187

Nom. diameter (mm)	Field of application					Nom. cross section (mm <sup>2</sup> )	Nom. mass/ metre (kg/m)
	Bars	Coils and aligned products		Electro-welded mesh and trusses			
		B500C	B500A	B500C	B500A		
6,0	√	√	√	√	√	28,3	0,222
6,5		√		√		33,2	0,260
7,0		√		√		38,5	0,302
7,5		√		√		44,2	0,347
8,0	√	√	√	√	√	50,3	0,395
10,0	√		√		√	78,5	0,617
12,0	√		√		√	113	0,888
14,0	√		√		√	154	1,21
16,0	√		√		√	201	1,58
18,0	√					254	2,00
20,0	√					314	2,47
22,0	√					380	2,98
25,0	√					491	3,85
28,0	√					616	4,83
32,0	√					804	6,31
40,0	√					1257	9,86

The units to be measured, in addition to the supply, transport on site, configuration and installation of the reinforcement, include the following:

- The connection of the bars in a solid manner, at all cross-sections independently and not alternately, by wire of thickness according to the diameter and position of the reinforcement or by welding in the case of injected piles.
- The supply of the mooring wire.
- The supply and installation of spacers to ensure the thickness of the reinforcement coating provided in the study, as well as joint locks (according to ISO 15835-2).
- The installation of supports (cavaliers, stirrups) and special suspension pieces that may be required (labor and materials).
- The reduction and wear of reinforcement during cutting and machining.