Exploration & Production

GENERAL SPECIFICATION

CIVIL WORKS

GS EP CIV 103

Fences

04	10/08	General review
03	10/07	Update of Reference documents - Change of §3, 4, 5 and 6
02	10/05	Addition of “EP” root to GS identification
01	09/03	Change of Group name and logo
00	03/01	First issue
Rev.	Date	Notes

Contents

1. Scope

This specification deals with the manufacture and installation of fences and their accessories. General specifications indicate what the COMPANY considers as an acceptable minimum. However, some supplies and/or works may be of a particular nature.

In this case, the COMPANY reserves the right to modify or supplement general specifications by particular specifications.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

When local national standards, regulations and codes exist, all design, engineering, materials and construction shall conform to their latest requirements, which complete or modify the present specifications.

In case of lack of mandatory local national standards, international norms and standards will be applied.

In case of lack of international norms and standards, national norms and standards listed hereafter will be applied.

In all cases the system adopted shall be consistent, i.e. the various texts shall present no incompatibility. Any dispute shall be resolved by basing works on the most stringent text for the Construction CONTRACTOR and at his expense.

The list of specifications and norms quoted is not exhaustive: the CONTRACTOR shall respect the secondary standards and regulations, which cover the works described in the present specification.

Certain specifications and norms may be indicated with an issue date. This is for information only and on the understanding that the most recent issue shall be used.

Standards

Reference	Title
	International standards and codes
ISO 7900	Steel wire and wire products for fences zinc-alloy-coated steel barbed wire
	European standards and codes
EN 10223	Steel Wire and Wire Products for Fences
	French standards and codes
NF A 45	*Produits sidérurgiques* (Iron and Steel Products)
NF A 49	*Tubes en acier* (Steel Tubes and Tubular Products)
NF A 91-131	*Fils d'acier galvanisés à chaud - Spécification du revêtement de zinc* (Hot-Dipped Steel Wire - Specification for zinc coating)

Reference	Title
NF E 84-003	*Grillage simple torsion pour clôtures* (simple torsion wire fabric for fences)
NF P 22-255	*Assemblages soudés de profils creux ronds ou rectangulaires sur profils de type I ou H - Conception et vérification* (Metal structures welded joints of hollow profiles, round or rectangular on I and H sections - Design - Testing)
NF P 26	*Quincaillerie* (Hardware)
	American standards and codes
ASTM A 116	Specification for Metallic-Coated Steel Woven Wire Fence Fabric
ASTM A 121	Specification for Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 123	Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 392	Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 641	Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
ASTM A 702	Specification for Steel Fence Posts and Assemblies, Hot Wrought
ASTM A 817	Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric
ASTM F 552	Terminology Related to Chain Link Fencing
ASTM F 567	Practice for Installation of Chain-Link Fence
ASTM F 626	Specification for Fence Fittings
ASTM F 900	Specification for Industrial and Commercial Swing Gates
ASTM F 1083	Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1184	Specification for Industrial and Commercial Horizontal Slide Gates
ASTM F 1553	Guide for Specifying Chain Link Fence
	English standards and codes
BS 1722	Fences
BS 4102	Specification for Steel Wire for General Fencing purposes
BS 6579	Safety Fences and Barriers for Highways

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
GS EP CIV 300	Reinforced and prestressed concrete
GS EP CIV 301	Design of reinforced or prestressed concrete
GS EP CIV 101	General earthworks
GS EP GEO 303	Onshore land surveying and positioning works

3. The project

Unless otherwise indicated in the particular specifications, fences shall be of the following types:

Type	Height	Use
1	at least 2.5 m	External fencing
2	at least 2.0 m	Internal fencing Fencing around electrical installations

Type 1 fencing shall be galvanized anti-intruder chain link. It shall be provided with three rows of barbed wire mounted on 400 mm long extension arms on fence posts. These arms shall be cranked at 45° towards the outside.

The location of outside fencing for boundary limits shall be in compliance with local legislation.

This legislation and/or the limited dimensions of the available land may involve setting the barbed wire at a 45° angle towards the inside.

The particular specifications shall indicate the areas where this modification is to be applied.

The height of external fencing shall be minimum 2.5 m from grade elevation to the bottom line of barbed wire attached to the cranked top of the fence posts.

Furthermore the height of internal fencing shall be minimum 2.0 m from grade elevation to the bottom line of barbed wire attached to the cranked top of the fence posts.

The fencing around electrical installations shall be earthed.

The chain link mesh shall be tied with hair pin staples grouted in a concrete strip foundation under the fencing.

The width for gates shall be at least 1.00 m for pedestrians and 3.00 m for vehicles.

4. Description

4.1 General

The fences shall be made of:

- Wire fabric
- Regular posts, corner posts, gate posts and end posts
- Tension wires
- Bracing within the fence plane.

Accessories shall be:

- Barbed wire and supports
- Gates
- Miscellaneous accessories
- Ditch and stream crossings, etc.

4.2 Wire fabric

Wire fabric shall be of double torsion type with 50 mm diamond-shaped mesh.

The top and bottom selvages of fabric shall be twisted and barbed.

The wire shall be hot-dip galvanized after weaving. The minimum zinc coating shall be 610 g/m² of uncoated surface.

The diameter of the wire shall be 3.9 mm.

The wire shall have minimum tensile strength of 550 MPa.

Particular specifications may specify plastic coating.

4.3 Posts

All posts shall be carbon steel and have a tensile strength of 310 MPa, and shall be galvanized (at least 600 g of zinc per m²).

The posts shall be embedded in concrete foundations.

The type of post shall be proposed to the COMPANY for agreement.

Particular specifications may specify plastic coating.

4.4 Tension wires

These wires shall be hot-dip galvanized (min. 370 g/m^2) and shall have a tensile strength of 1250 MPa .

Particular specifications may specify plastic coating.

4.5 Bracing

Bracing shall be carbon steel and have a tensile strength of 310 MPa, and shall be galvanized (at least 600 g of zinc per m²).

Bracing panels shall include:

- Compression bar at the upper part
- Intermediate compression bar
- Tension bar at the lower part.

4.6 Barbed wire and supports

Barbed wire shall be of a good commercial quality, shall conform to Standard Requirements, galvanized with minimum zinc coating of 244 g/m² uncoated surface.

The diameter of the main wire shall be at least 2.5 mm.

The diameter of the barbwire shall be at least 2.0 mm.

The barbs shall have four hooks and shall be spaced at intervals equal to 125 mm.

Extension arms shall be such that the barbed wire is held in slots with lugs or tie wires. Holding barbed wire in place by only using its own tension is forbidden.

In the case of a type 1 fence, regular posts, corner posts and gateposts shall be equipped with supports.

Posts that are not equipped with supports shall be closed at the top.

4.7 Gates

Gates shall be of welded construction. They shall be suitably braced and equipped with adjustable diagonal tension bars so as to prevent buckling. The type of gates shall be proposed to the COMPANY for agreement.

In the case of a type 1 fence, the panel height shall be extended 300 mm above the upper bar and shall support three rows of barbed wires. A system for the tightening of these wires shall be provided.

Gates shall be furnished with hinges of a type which prevents easy removal from the gate posts. Hinges should be of solid construction and adjustable. They should allow a 180° rotation (90° both ways from the closed position).

All the gates shall be completely fitted with a vertical type latch running from the top to the bottom of the gate. The latch shall be designed so that it can be maintained in “closed” position when the gate is open.

Provisions shall have to be made for the attachment of a padlock. The padlock shall be accessible from both sides of the gate.

The top of gates shall be level the top of the chain link fencing.

The clear distance between gate and end fence post shall be maximum 50 mm. The foundation for these two posts shall be common.

As a general rule, all hardware shall be compatible with the type of gate selected.

If removable panels are to be used, they shall have a structure similar to that of the gates. They shall enable quick and easy dismantling or reassembling.

4.8 Ditch and stream crossings, etc.

Openings of more than 625 cm^2 shall be closed either by interlocked wire fabric or by barbed wire rolls (concertina).

4.9 Mapping Requirements:

The general layouts of the site with fences shall be geo referenced using the Project Coordinate Reference System parameters provided by COMPANY.

The following features shall be included on each charts, but not limited to:

- A title, a graphic scale (Bar scale) and Numeric scale, specify the drawing format for which the numeric scale is applicable, a legend
- The projected Company Coordinate System Grid, the geographic coordinate system ticks and Local Engineering Grid, when applicable
- A situation Map
- The reference of the source drawings
- Full Company Coordinate system parameters, transformation parameters between the Company Coordinate system and the Local Engineering Grid when applicable

The native files shall be provided in AUTOCAD or MICROSTATION and PDF formats. The CAD files shall be georeferenced using the project coordinate system and structured thus:

- Separate layers for each feature type (contours lines, elevation roads, etc…)
- Continuous lines (e.g. contours lines) shall be drawn as continuous 2D or 3D polylines

CONTRACTOR may also propose to provide data in GIS formats (as ESRI shapefile or Geodatabase).

5. Construction

5.1 General

The fence shall not be located more than 15 mm away from its theoretical position.

The fence shall be erected keeping a clear distance of 50 mm from the ground.

The fence shall follow the ground profile (either natural ground or ground after site preparation). General earthworks shall be made in accordance with GS EP CIV 101 and completed before fencing installation, however local grading of the ground may be required in order to provide a smooth top line of the fence.

Fences shall be erected plumb and straight between corner posts.

There shall be a concrete strip foundation under the external fence. The height of concrete strip foundation shall be at least 250 mm above the ground and at least 500 mm under the ground. The width of concrete strip shall be at least 360 mm. Concrete shall comply with Standards Requirements (GS EP CIV 300).

The Construction CONTRACTOR will carry out the benchmarking and staking of the fence layout and the necessary excavations for foundations and ground levelling if needed.

5.2 Posts

All terminal, angle, corner, and pull posts shall be rigidly braced.

Posts shall be spaced at intervals smaller than 3.00 m. They shall be sealed in 25 MPa compression strength concrete. Minimum embedment length shall be 750 mm for posts with a minimum lateral dimension of 60 mm and 100 mm for larger posts.

Foundations shall extend above the ground level and the concrete surface shall be sloped upward toward posts so as to avoid water seepage. The concrete foundations shall be sized to provide a required cover over metal surfaces.

Foundations concrete shall comply with Standards requirements (GS EP CIV 300).

Gate and end posts shall be connected to the adjacent posts by braced panels.

Corner posts shall be connected to the two adjacent posts by braced panels.

Pipe rails may be installed a the top, middle and bottom of posts and the fabric shall be weaved over top and bottom rails and tied to the middle rails at 600 mm intervals.

5.3 Wire fabric

Wire fabric shall be fixed on top and bottom by tie wire, with clips spaced at intervals no more than 300 mm.

The wire fabric shall be stretched tight and solidly fixed to posts.

It shall be cut and each panel shall be separately attached to the end posts by using tension bars, fixed to the posts with clips spaced at no more than 350 mm intervals.

The continuity of the wire mesh shall be ensured by passing a wire through the end of the adjacent roll, thus forming a continuous mesh.

5.4 Tension wires

Number of rows of tension wires shall be defined in particular specifications (usually as an Appendix or Exhibit to the Contract Project).

6. Testing

All tests shall be made by qualified independent laboratory, to be approved by Company.

Tests on concrete shall be in accordance with GS EP CIV 300.

Material test certificates for reinforcement, fencing and gates material shall be supplied by vendors and submitted to COMPANY by CONTRACTOR.