FREYSSINET PRODUCTS CO.

SAS FREYSSINET PRODUCTS COMPANY
ZA DU MONAY - BP 18
71210 SAINT EUSEBE France
Tel. +33.3.85.73.69.00

PRODUCT DESCRIPTION

SystemFreyssi500-E

Ref: BGT-003
Revision: 0
December 2018

FREYSSINET

SUSTAINABLE TECHNOLOGY

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.

REVISION INDICES FOLLOW-UP TABLE

Rev	Date	Modification	Prepared by	Checked by	Approved by
0	12/12/18	1ère diffusion	C. GAUCHERAND	F. ROBERT	E. THIBOEUF
A	12/12/18	/	C. GAUCHERAND	F. ROBERT	E. THIBOEUF

SOMMAIRE

1. INTRODUCTION

1.1. Scope of the document

This document is intended to describe the product in term of design, manufacturing and inspection, as well as the interaction between the different parts involved in a project.

1.2. Geotechnics

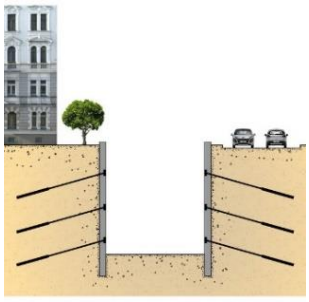
The Freyssinet Group is the world leader in specialized civil engineering, working in two fields: structures and soil. The structural activities include pre-tensioning, cable-stayed structures and strengthening of structures. As part as these activities, Freyssinet supplies structural bar systems like HRod for bridges and buildings.
The Freyssinet Group is organized in geographical zones around the world with strong local roots, with 70 bases in more than 50 countries. It is a subsidiary of Vinci Construction, world leader in construction and associated services, which combines almost 2,500 companies in more than 100 countries all around the world.
The Freyssi500-E System is designed to meet many international standards and recommendations, as well as the environmental requirements specific to this type of product.

FPC, headquartered in Saint Eusèbe, France, is the industrial branch of the Freyssinet group. It coordinates all the production of the products distributed within the group (prestressing anchors and stay cable, bridge fittings, geotechnical products, etc.). To cope with the increasing demand of all the Freyssinet subsidiaries in the world, FPC has developed an important network of production facilities all over the world, implementing the same Quality Control System worldwide, in accordance with International Quality Standards. As a result of this group strategy of procurement network, the Freyssinet subsidiaries have improved their services worldwide, and offer flexible and reactive solutions to their clients' needs.

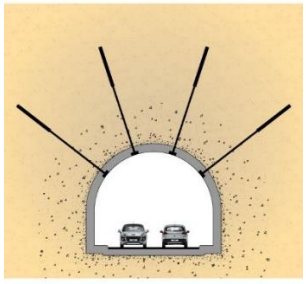
1.3. Freyssi500-E scope of use

Freyssi500-E system is mainly used in geotechnical engineering for slope reinforcement, retaining walls and structural anchoring, but it is also used in civil engineering.
Developed by Freyssinet, the Freyssi500-E System is a bar on which accessories are mounted to perform functions specific to each use case.

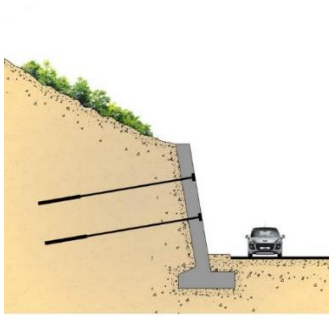
The common cases of use in geotechnical engineering are:



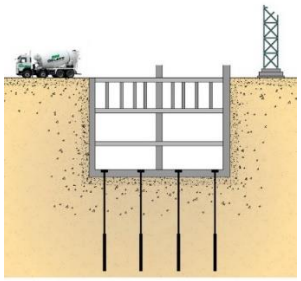
Excavations



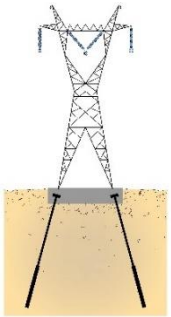
Tunnels



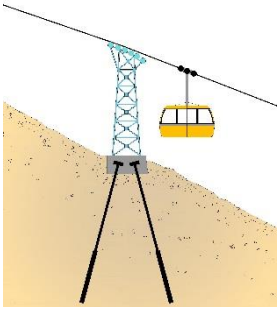
Comfort



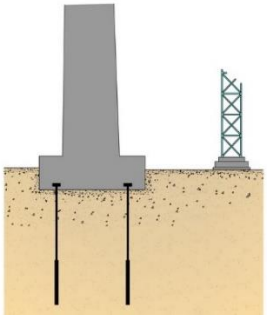
Thrust recovery hydrostatic



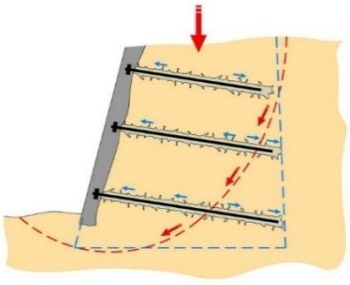
Pylons



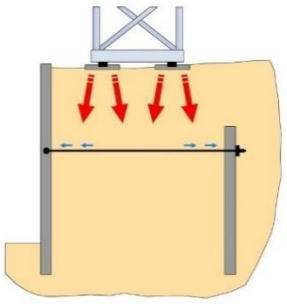
Ski lifts



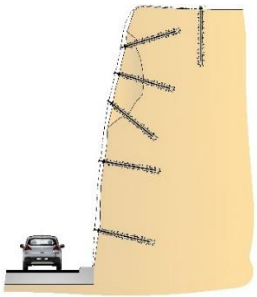
Wind turbines



Soil nails

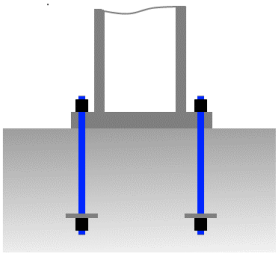


Dock walls

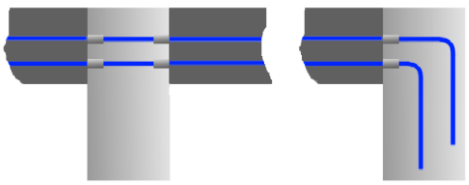


Rock bolts

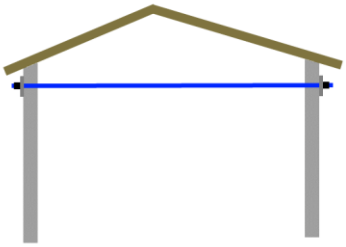
Les cas courants d'utilisation en génie civil sont :



Bolting



Sleeving of reinforcements



Tie rods

1.4. Conception

The Freyssi500-E System consists of a screwable steel reinforcing bar, and various compatible accessories. Specific accessories can be offered on request. The accessories transmitting the forces (nuts, couplers) are designed and tested to resist at least the bar's breaking limit.

1.5. Manufacturing

As Freyssi500-E are manufactured by Freyssinet, all customers will receive the same level of excellence and quality in the products and services. This complete control over our products and systems means that we can adapt our solutions to a wide range of applications and extreme operating conditions.

1.6. Installation

The installation is generally carried out by the customer and depends on the use case.

2. APPLICABLE DOCUMENTATION

2.1. Specific documentation

The use of the Freyssi500-E System is inseparable from the following document (at its latest version)

- Internal specifications: GB500E-SPA 001

2.2. Standards for components

FPC has analyzed the standards to meet all material, manufacturing and control requirements. The system complies with most applicable national and international standards.

2.2.1. Freyssi500-E bar

Designation	Applicable standard	Material
Bars	EN 10080	Weldable steel for reinforced concrete

2.2.2. Accessories

Designation	Applicable standard	Material
Anchoring plates	EN10025	S235 steel, oxycut or sheared
Nuts	EN 10293	G42CrMo4 + QT2
Couplers	EN 10293	G42CrMo4 + QT2

2.3. Standards for manufacturing

Designation	Applicable standard
Dimensional characteristics (bars & accessories)	Drawings
Mechanical and chemical characteristics (bars)	EN10080
Mechanical and chemical characteristics (accessories)	EN10025 / EN 10293

2.4. Control standards

Designation	Applicable standard
Bar characteristics	EN ISO 15630-1
Material certificates (bars, nuts, couplers)	Certificat 3.1 regarding EN10204

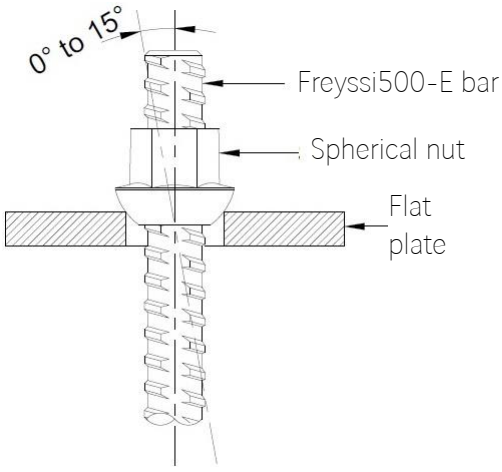
3. DESCRIPTION OF FREYSSI500-E SYSTEM

3.1. Principle

The system is called "Freyssi500-E System". It is composed of different elements assembled together to create anchoring or coupling solutions.

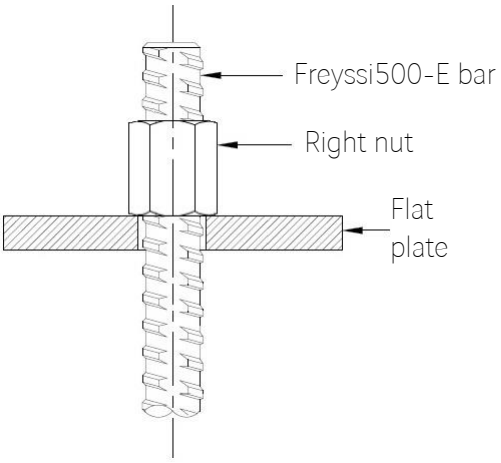
The main components are:

- The Freyssi500-E bar
- The nut
- The coupler
- The plate



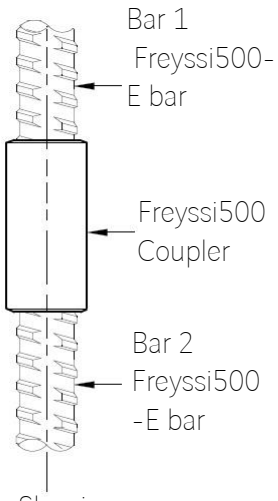
Spherical anchor

The combination of a spherical nut and a flat plate allows angle compensation up to 15°. The strength of the anchor is greater than the strength of the bar.



Flat anchor

The combination of a right nut and a flat plate is used when the bearing surface is perpendicular to the axis of the bar. The strength of the anchor is greater than the strength of the bar.



Sleeving

The coupler is used to connect two bars together. The resistance of the sleeve is higher than the resistance of the bar.

3.2. Bars

The Freyssi500-E bar is a hot-rolled ribbed bar. It has ribs that form a thread along its entire length, which allows accessories to be screwed in at any point. The Freyssi500-E bar can be welded in the same way as any other reinforcing steel. The very robust left-hand thread is characteristic of the Freyssi500-E bar. The standard range includes the following diameters:

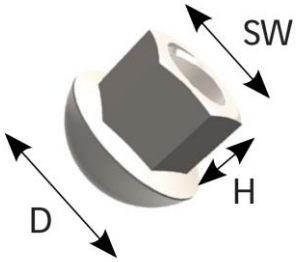
Nominal diameter		**16**	**20**	**25**	**28**	**32**	**40**	**50**	**57,5**	**63,5**	**75**
Steel class	MPa	500/550	500/550	500/550	500/550	500/550	500/550	500/550	555/700	555/700	500/550
Section	mm^2	201	314	491	616	804	1257	1963	2597	3167	4418
Mass	kg/m	1.58	2.47	3.85	4.83	6.31	9.87	15.41	20,38	24.86	34,68
Max. diameter	mm	18.00	22.40	27.90	31.20	36.00	44.20	55.60	63,00	67.80	81,50
Breaking limit: Fpk	kN	110	172	270	339	442	691	1078	1818	2217	2430
Elastic limit: Fp0.2%	kN	101	157	246	308	402	628	980	1441	1758	2209
Pas	mm	8	10	12.5	14	16	20	26	20	21	24
Average Young's modulus	GPa	200	200	200	200	200	200	200	200	200	200
Min. elongation at break (A%)	%	10	10	10	10	10	10	10	10	10	10

3.3. Accessories

The dimensions of the accessories are given for information only, and are subject to change at any time. If they are important for their use, they should be checked with FPC in advance.

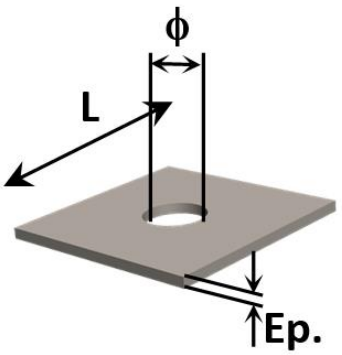
3.3.1. Spherical nut

		16	20	25	28	32	40	50	57,5	63,5	75
H	mm	33	41	45	54	57	70	100	-	120	-
D	mm	42	49	55	62	70	80	100	-	120	-
SW	mm	30	35	41	43	46	65	80	-	100	-
Mass	kg	0,20	0,30	0,35	0,40	0,70	1,20	2,25	-	4,80	-



3.3.2. Plate for spherical nut

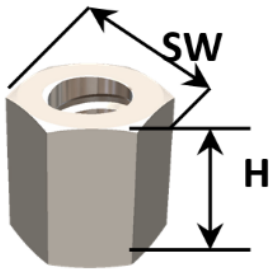
		16	20	25	28	32	40	50	57,5	63,5	75
L x L	mm	120	150	200	200	200	200	250	-	300	-
Ep.	mm	8	10	10	10	10	20	30	-	50	-
Ø	mm	34	41	46	52	58	70	87	-	110	-
Mass	kg	0,85	1,66	3,00	2,97	2,93	5,68	13,32	-	31,59	-



The justification of the dimensions is the responsibility of the project design office.
The above plates are the most commonly used, but others can be provided on request.

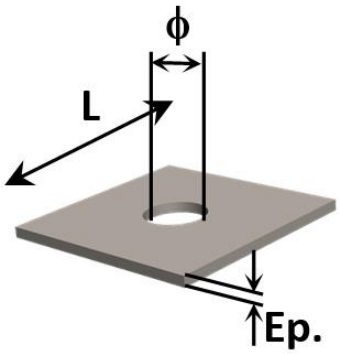
3.3.3. Straight nut

		16	20	25	28	32	40	50	57,5	63,5	75
H	mm	40	45	50	55	60	70	85	125	135	160
SW	mm	32	36	41	46	55	65	80	90	100	120
Mass	kg	0,20	0,30	0,35	0,40	0,70	1,20	2,25	5,00	6,60	10,90



3.3.4. Plate for right nut

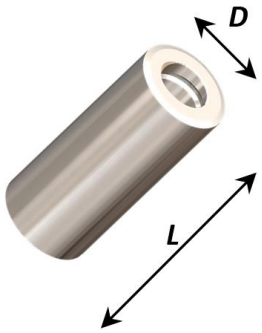
		16	20	25	28	32	40	50	57,5	63,5	75
L*L	mm	120	150	200	200	200	200	250	250	300	350
Ep	mm	8	10	10	10	10	20	30	40	50	60
Ø	mm	24	24	34	34	41	46	58	70	87	100
Mass	kg	0,88	1,73	3,07	3,07	3,03	6,02	14,10	18,42	33,00	54,00



The justification of the dimensions is the responsibility of the project design office.
The above plates are the most commonly used, but others can be provided on request.

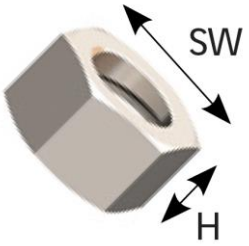
3.3.5. Coupler

		16	20	25	28	32	40	50	57,5	63,5	75
L	mm	90	105	115	125	140	160	200	230	260	320
D	mm	32	36	40	45	52	65	80	95	102	115
Mass	kg	0,39	0,52	0,60	0,84	1,32	2,34	4,49	7,50	9,43	15,50



3.3.6. Lock nut

		16	20	25	28	32	40	50	57,5	63,5	75
H	mm	15	20	20	25	30	35	50	60	75	80
SW	mm	32	32	41	41	50	60	80	90	90	110
Mass	kg	0,20	0,30	0,35	0,40	0,70	1,20	1,25	1,93	3,00	4,53



4. Manufacturing

4.1. Site of production & distribution

The bars are manufactured in Czech Republic. They are then transported, stored and processed at the Freyssibar Center in France.

4.2. Manufacturing process

4.2.1. Raw material inspection

Bars and accessories are delivered to the Freyssibar Center in France. All material certificates are analyzed and validated.

4.3. QSE

The quality assurance system in force in the factory complies with, or be equivalent to, the standard ISO 9001: 2008.

4.3.1. Quality - ISO 9001

FPC is certified since September 1997 (according to successive standards as ISO 9002 v94 and ISO 9001 v2000). Since the renewal audit of June 2018, the company is certified ISO 9001 v2015.

Manufacturing, sale and trade of structure equipment (road expansion joints, bearings and seismic protection devices) and components for cable stays and concrete prestressing.

Trade of products for structure reinforcement.

Exclusion from the field of application: Design and development carried out by the Technical Department of Freyssinet International & Cie.

Safety - OHSAS 18001

FPC is certified OHSAS 18001 v 2007 since April 2011.

4.3.1. Safety - OHSAS 18001

FPC is certified OHSAS 18001 v 2007 since April 2011.

4.3.2. Environment – ISO 14001

FPC is certified OHSAS 18001 v 2007 since April 2011.


Certificat
Certificate
N° 1997/8276.10
FREYSSINET PRODUCTS COMPANY
ISO 9001 : 2015
2018-07-05
2021-07-04
Franck LEBEUGLE
Directeur Général d'AFNOR Certification
Managing Director of AFNOR Certification


Certificat
Certificate
N° 2011/39985.5
FREYSSINET PRODUCTS COMPANY
OHSAS 18001 : 2007
2018-07-05
2021-03-11
Franck LEBEUGLE
Directeur Général d'AFNOR Certification
Managing Director of AFNOR Certification


Certificat
Certificate
N° 2010/38401.4
FREYSSINET PRODUCTS COMPANY
ISO 14001 : 2015
2018-07-05
2021-07-04
Franck LEBEUGLE
Directeur Général d'AFNOR Certification
Managing Director of AFNOR Certification

4.3.3. Quality documentation

Different levels of quality documentation can be proposed (from level 0 to level 2). The definition of each level is available on the quality file price list sent with the offer. The level of the quality documentation has to be determined at the beginning of the project.

Item	Documentation	Level 0	Level 1
General Documentation	Delivery note Certificate of conformity	X	X
Bar	Material certificate 3.1	-	X
Nuts & couplers	Material certificate 3.1	-	X

*All documents can be shown during an audit.