ARCHITECTURAL HANGER

HROD

Data sheet n°: FT En C II 4 3

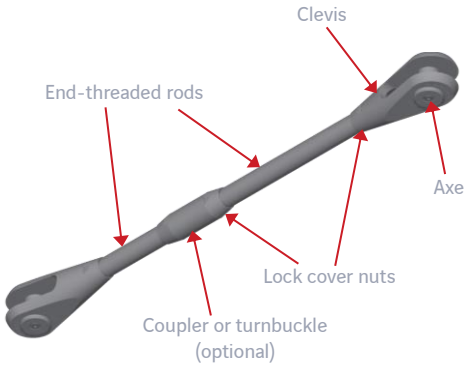
- Large standard range
- Fatigue resistant
- Simple connection to the structure
- Possible custom made solutions
- Quick installation
- High-performance hinged connection

An architectural anchor

A clevis is a simple, efficient and elegant way to anchor a structural rod to a structure. A steel gusset with a hole is sufficient, making the need for sophisticated connections unnecessary. For all the rod diameters and grades mentioned below, Freyssinet offers a range of aesthetic and functional clevis that provide all the required qualities in terms of strength and durability.

Description

Typical arrangement of a HRod (made of bar and end terminations) is shown below.
Each rod is end-threaded to ensure the connection with a clevis, a coupler or a turnbuckle. The thread is left hand on one end, and right hand on the other end, in order to ease the installation. The maximum length of a single bar is 11,80 m.
A lock cover nut is used to block the clevis, the coupler or the turnbuckle and also to cover the excess of threaded part of the rod after setting of the HRod.
HRod is designed according to EN 1993-1-Eurocode 3, exposition Class 3. It also complies with PTI DC45.1-12.



Main components of HRod

Applications

Hrod systems can be used as hangers of the structure or as architectural bars or roof supporting elements. Typical use cases include facades, bracing of steel structures, suspension bridges, bowstring bridges.

Suspension of a terrace (MUCEM museum, Marseille, France)

Advantages

- **Simplicity**: during installation (prefabricated hangers can be delivered on site) and maintenance
- **Durability**: steel hangers are galvanised or plated; the SS460 range is made from high quality stainless steel
- **Aesthetics**: the same design regardless of the forces involved
- **Angular correction (*)**: clevis design allows for 10 mrad of misalignment (i.e. 0.5°), which is usually enough to compensate for potential structural inaccuracies. Higher angles on request
- **Adjustment**: adjustment can be increased with the use of a turnbuckle
- **Tension**: tension and re-tension of rods can be adjusted by force or by length

(*) Larger angular corrections are available upon request. Please contact Freyssinet Engineer.

Range of HRod

HRod type is a combination of a steel grade and a diameter:

Range of steel grade:

Steel grade	S520	S700	SS460
Type of steel	Carbon steel	Carbon steel	Stainless steel
Yield strength (N/mm²)	520	700	460
Ultimate strength (N/mm²)	670	900	650
Minimum bar elongation after break	17%	15%	25%
Resilience KV (J)	27 at -20°C	27 at 0°C	100 at +20°C

Other steel grades on request and subject to study

Range of diameters:

Thread diam.	S520			S700			SS460		
	Yield load	Ultim. load	EC3*	Yield load	Ultim. load	EC3*	Yield load	Ultim. load	EC3*
M16	81	105	76	110	141	102	72	102	73
M20	127	164	118	171	220	159	113	159	115
M24	183	236	170	247	317	228	162	229	165
M30	292	376	270	392	505	363	258	364	257
M36	425	547	394	572	735	529	376	531	380
M42	583	751	541	785	1009	726	516	729	522
M48	766	987	711	1031	1326	955	678	958	665
M52	914	1178	848	1230	1582	1139	-	-	-
M56	1056	1360	979	1421	1827	1315	934	1320	923
M64	1392	1793	1291	1873	2408	1734	1231	1739	1222
M68	1589	2047	1474	2139	2750	1980	-	-	-
M78	2139	2756	1984	2879	3702	2666	1892	2674	1847
M83	2445	3150	2268	3291	4231	3047	2163	3056	2102
M88	2771	3570	2571	3730	4796	3453	2451	3464	2373
M93	3118	4017	2892	4197	5396	3885	2758	3859	2660
M98	3485	4490	3233	4691	6031	4342	3083	4356	2964
M103	3872	4989	3592	5212	6702	4825	-	-	-
M113	4708	6066	4368	6338	8149	5867	-	-	-
M123	5626	7249	5219	7574	9738	7011	-	-	-
M133	6626	8537	6147	8919	11468	8257	-	-	-

* EC3 = Resistance at ULS according to Eurocode 3 — All values in kN
Other diameters on request and subject to study

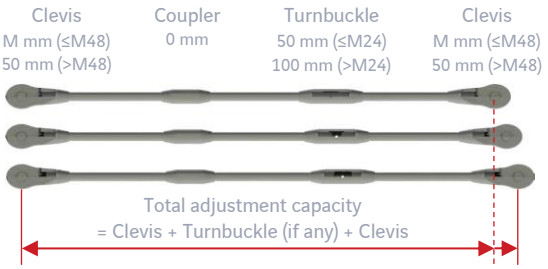
ARCHITECTURAL HANGER

HROD

Installation

- **Components definition**

Depending on the length of each HRod and the tolerances of the structure, the use of couplers and/or turnbuckles is defined. Adjustment capability of the system is a key point.

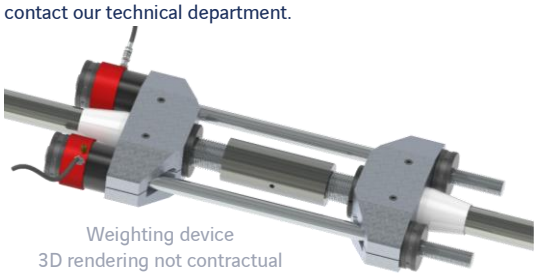


- **Assembly**

The components are all screwed together and connected to the structure through the clevis.

- **Setting**

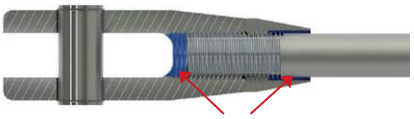
Generally, each HRod pin to pin length is setted considering the final geometry of the structure, and the lock cover nuts are tightened to lock the system. The structure itself will then load the rods when it is commissioned. Standard weighting tools are available from M16 to M64 to evaluate the load in the installed bar up to 100 Tons capacity. For adjustment after installation, contact our technical department.



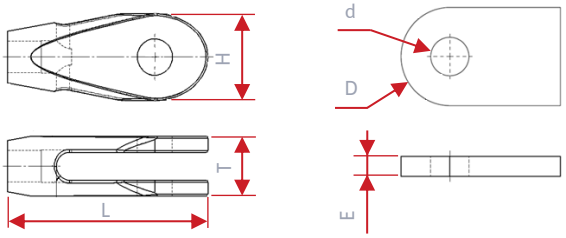
Weighting device
3D rendering not contractual

- **Final protection**

All the voids between the lock cover nuts, the clevis and the bars are filled with resin to seal the thread area.



Connection details



Thread diam.		Clevis		
Gr500	Gr700	L	T	H
M16	-	108	30.5	46
M20	M16	128.5	36.5	54
M24	M20	147	44.5	63
M30	M24	180.5	55	78
M36	M30	212	66.5	93
M42	M36	244.5	76.5	109
M48	M42	278	88	125
M52	-	295	91	136
M56	M48	322.5	99	147
M64	M52	357	117	169
M68	M56	367	121	177
M78	M64, M68	430	146	208
M83	-	448	151	219
M88	M78	485	157	237
M93	-	491	172	246
M98	M83	523	182	261
M103	M88	542	187	277
M113	M93, M98	594	202	303
M123	M103	633	232	329
M133	M113	678	251	354
-	M123	721	270	375
-	M133	774	291	406

Thread diam.	Gusset for S520			Gusset for S700			Gusset for SS460		
	E	d	D	E	d	D	E	d	D
M16	12	18	31	15	22	38	12	23	37
M20	15	22	38	20	25	42	15	27	44
M24	20	25	42	25	31	53	20	30	48
M30	25	31	53	30	37	63	25	36	59
M36	30	37	63	35	43	74	30	42	69
M42	35	43	74	40	49	85	35	48	79
M48	40	49	85	45	58	101	40	54	90
M52	40	53	94	55	66	113	-	-	-
M56	45	58	101	55	69	122	45	65	109
M64	55	66	113	70	82	140	55	73	121
M68	55	69	122	70	82	140	-	-	-
M78	70	82	140	70	92	167	70	89	149
M83	70	86	151	85	102	181	70	93	160
M88	70	92	167	85	106	192	70	99	173
M93	80	96	169	90	116	214	80	103	177
M98	85	102	181	90	116	214	85	109	189
M103	85	106	192	110	126	229	-	-	-
M113	90	116	214	120	135	246	-	-	-
M123	110	126	229	-	-	-	-	-	-
M133	120	135	246	-	-	-	-	-	-
M123	-	-	-	130	144	261	-	-	-
M133	-	-	-	140	155	282	-	-	-

Dimensions in mm

Please note that for SS460 range, an **isolation ring** and **isolation flanges** are installed in order to avoid any contact between the stainless-steel components and the steel gusset.

Corrosion protection

S520 and S700 Hrod corrosion protection coating should be defined by the designer depending on the environment. The HRod can be delivered not protected (without corrosion protection), hot dip galvanized, with a partial corrosion system (final layers to be applied on site after installation) or with the full corrosion protection system.

Value chain

Full value chain expertise

- Design services
- Technical support
- In-house manufacturing and supply
- Integration and installation
- Inspection, monitoring, maintenance and replacement services

Decines Bridge, France