1X15 Anchorage

- Covered by a CE marking
- In service structural strengthening
- Adapted to a large range of circular structures
- High corrosion protection

Monostrand loop anchorage

Technical data sheet reference: FT En R II 1 2 1

Introduction

Freyssinet has developed a specific anchorage for the active strengthening of circular structures, the 1X15. This anchorage uses post-tensioning (PT) cable loops to apply pressure on the structure being repaired, is suitable for all circular structures including silos, tanks, chimneys, cooling towers, pipes, old brickwork, etc.

Description

• Loops

The loops are composed of unbonded PT strands (called monostrands) inserted into a High-Density PolyEthylene (HDPE) general duct; the annular space in the duct is cement grouted.

The characteristics of the strands that can be used are as follows :

Diameter	Type	Designation	F_{pk}
Ø 15,2	T15	Standard strand	260 kN
Ø 15,7	T15S	Super strand	279 kN
Ø 15,2	T15C	Compact strand	300 kN

The PT strands themselves are individually protected by grease and a HDPE extruded coating; the protection allows the strand to slide freely without being bonded to the structure.

Cement grout is injected into the duct before tensioning the tendon so that the monostrand is perfectly embedded and a more uniform pressure is applied on the concrete facing. The strand itself is thus perfectly protected against corrosion by two barriers :

- the individual grease protection & HDPE sheath, to prevent the circulation of humidity,
- the HDPE outer duct, filled with cement grout.

For applications in an aggressive environment or if longer durability is required, galvanised strands may also be used.

Finally, the loops can be protected against mechanical or thermal aggression embedding them with shotcrete.

• Anchorage

The body of the anchorage is made of ductile cast iron that bears on the structure being reinforced. It performs the following functions :

- Guiding of the monostrand from the duct to the anchorage,
- Connection with the general duct and the monostrand, using HDPE parts with fitting for the cement grout injection tube,

Performances

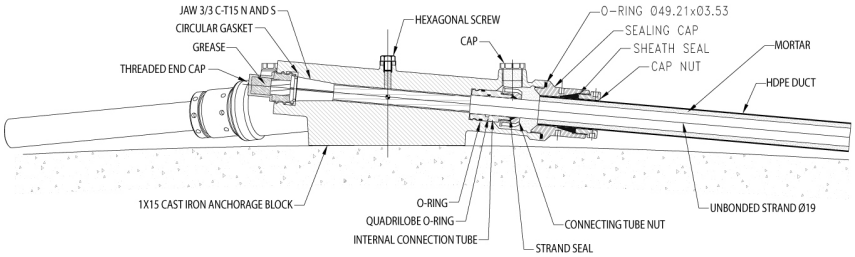
The 1X15 loop anchorage has successfully passed the static and dynamic tests specified by ETAG 013 (Guideline for European Technical Approval of PT kits). The 1X15 anchorage is covered by the ETA 06/0226 and has a CE marking.

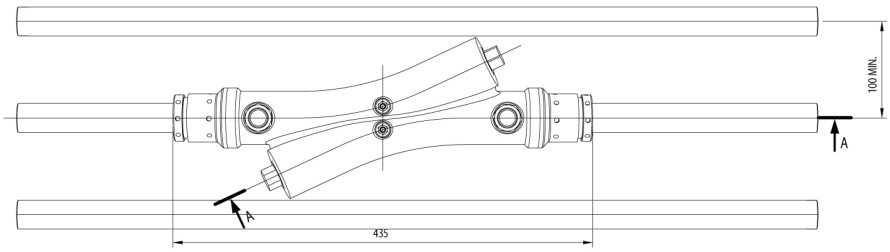
• Diameter of the structure

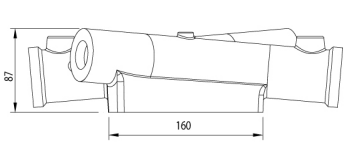
The 1X15 anchorage is suitable for a range of structural diameters, the standard diameter range is between 6 & 27.5m. For cable diameters less than 13m, the 1 X 15 anchorage is fitted with 2 transition shims which are installed under the cable just at the exits of the anchorage.

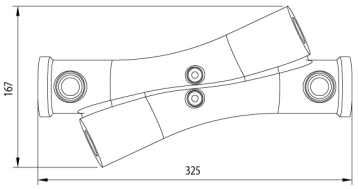
NOTA: Other structural diameters are possible but they will require a specific case study.

• 1X15 Anchorage









1X15 Anchorage

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- Cylindrical-conical holes & conical jaws (composed of three wedges) in which the strands are anchored,
- Corrosion protection of the jaws and their environment, by grease-filled HDPE caps,
- Corrosion protection inside the anchorages by injecting grease through screwed grease nipples.

Optional: In the event that the anchorage is used in an aggressive environment and not protected by shotcrete, it is possible to protect the outside of the anchorage by means of a Rilsan coating.

The 1X15 anchorage is designed to achieve a single "loop" PT strand (one complete ring around the structure). Each end of the strand enters into the body anchorage with the loop curvature radius, it is then deviated inside the anchorage guiding the strand to the cylindrical-conical orifice.

Installation

• Installation of monostrand and anchorage

The usual installation method consists of prefabricating the cables loops, the monostrands are cut to length and then inserted into the HDPE duct. The loops are then placed onto supports that have been previously fitted around the structure.

After preparation of the anchorage, the strands are inserted into the orifices and then anchored using wedges. The strands are inserted through the body of the 1X15 anchorage using a special hydraulic inserting device.

After insertion, the loop must be tightened to its final position and have perfect contact with the structure.

• Protection of anchorage zones and grouting of ducts

Anchorage zones are protected by filling the anchorage body with grease.

The next step is the cement grout injection into the annular space between the general duct and the monostrand.

Since grout quantities per loop are small, the operation can be done on several loops simultaneously.

• Tensioning

When the grout has reached the relevant compressive strength, the loops are tensioned using the SC2-M23 monostrand jacks adapted to the anchorage.

• Final protection of the anchorage zones

After removal of the overlengths, the remaining strand ends are protected by grease and a special HDPE cap.

Additional protection can be provided by locating the Anchorage in a pocket and filling the pocket with concrete, or embedded in a continuous rib.

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