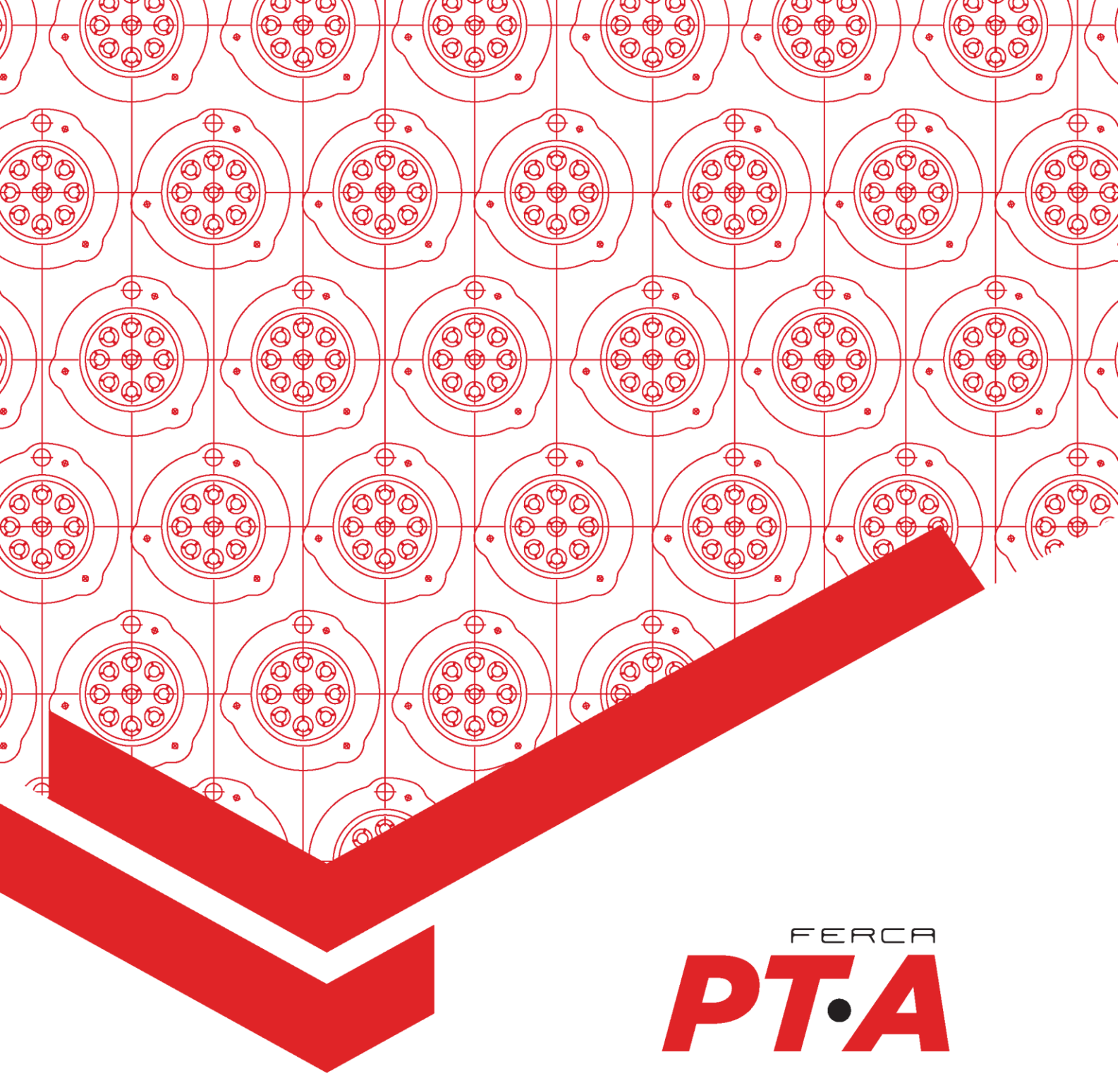


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TECHNICAL MANUAL
PTA

TTM – Multi-strand System

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Technical Manual – PTA System – *TTM Multi-strand Post-tensioning System*

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INTRODUCTION TO THE TTM SYSTEM

The **TTM tension technology** system was developed as part of an integrated approach to prestressing solutions for bridges and engineering structures, geotechnics and buildings, establishing the system as a player in a highly demanding and competitive international market. Built on extensive research and experience in manufacturing anchorages and specialist construction equipment, and as part of the ORI MARTIN steel group, TTM tension technology is currently active in areas such as:

- Prestressing in bridges and engineering structures;
- Prestressing in buildings;
- Geotechnical consolidation systems;
- Hydraulic equipment for pulling, pushing, grouting or production lines;
- Prestressing in tanks.

With an experienced technical department dedicated to the design and production of the system's various components and accessories, in-house manufacturing and testing facilities and a wide range of equipment, anchorages and accessories, the **TTM *tension technology*** system offers a comprehensive solution to meet market demands.



The TTM Multi-strand System is certified by the European Organisation for Technical Assessment (EOTA) under ETA 15/0329 (European Technical Assessment – TTM tension technology Bonded and unbonded multistrand post-tensioning system with 4 to 27 strands), attesting to its quality and suitability for use in a wide variety of situations and configurations.

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WHO IS TTM?

TTM *tension technology* was founded in 2001 and is headquartered in Milan, Italy, as an integral part of the ORI MARTIN SPA group, which has been producing high-quality steel since the early 20th century and has since sought to diversify its activities. This led to the creation of **TTM *tension technology***, a company specialising in the study, design and production of anchorage systems and the equipment for their installation on site, which has expanded its knowledge base through continuous investment in this sector and is firmly established both in its domestic market and internationally.



TTM SYSTEMS

In 2002, the post-tensioning systems for bridges and viaducts from **TTM *tension technology*** obtained certification for three strand types: T15, T15S and T15C, making it the first company in Europe to adopt post-tensioning systems with T15C strand, moving from the traditional strands with a nominal cross-section of 140 mm^2 to 165 mm^2. T15C strand reduces the number of strands in post-tensioning tendons, and the entire system is designed to accommodate strands of this class.

The M and D post-tensioning systems obtained CE marking, initially in accordance with ETAG 013 and currently with EAD 160004-00-0301, having been granted European Technical Assessment ETA 15/0329 for multi-strand systems and the corresponding CE marking 1777-CPR-15.07.

The post-tensioning systems for slabs and floors using monostrand in bonded or unbonded systems developed by **TTM *tension technology***, introduced innovative encapsulated anchorages to the market, providing full corrosion protection.

In short, the company's aim has been to offer its customers more effective, durable and sustainable products, CE marked under the respective European Technical Assessments.

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In systems for geotechnical applications, **TTM *tension technology*** has from the outset adopted the European standard EN 1537:2013 as the benchmark for its products. Adapting to the regulatory requirements of the European Community, the company is able to supply many applications beyond temporary and permanent ground anchors, which now include repeated or selective grouting systems, removable anchors, enhanced-bond systems or systems for crossing strata, and dielectric or encapsulated systems, offering additional benefits in corrosion prevention and in the durability of the intended actions.



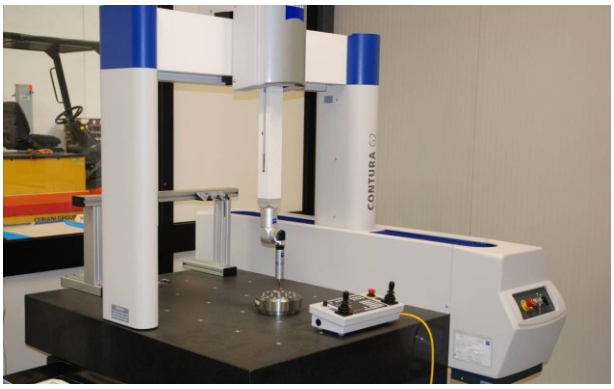
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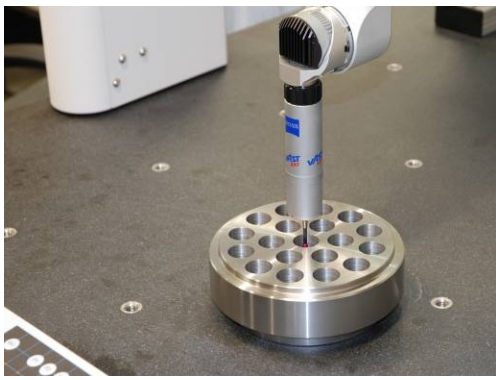
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TTM QUALITY

Since a product is the sum of the processes, resources and knowledge that create it, its quality is intrinsically linked to the excellence of the organisation in all its aspects and to the targeting of the investment needed in the committed pursuit of these goals.

As achieving a high level of quality in its products and services is now absolutely central to the company's strategy, **TTM** ***tension technology*** has developed very rigorous quality control procedures, and its laboratory is equipped with the most sophisticated measurement and control methods, enabling the required product characteristics to be verified.







In addition, the company has all the equipment needed to carry out a wide range of tests to continuously assess the quality of the production system, raw materials and final product, in accordance with internal procedures designed to guarantee the level of quality required of every single part produced.

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WHY USE POST-TENSIONING

Over the last decade, architecture has taken on a central role in real estate investment, accounting for many of a project's distinguishing features and thus representing essential added value for its success. This development is rooted in society itself, which today values not only the comfort and functionality of spaces, but also the image and social standing they convey. This paradigm shift has brought about a profound change in structural design concepts: today, a structural solution that enables the architect's creativity is valued more highly than strictly technical and economic criteria. By allowing slender and bold structures, prestressing meets current demands, so its use in buildings is becoming increasingly common and is set to continue growing.

The use of prestressing systems also significantly improves a structure's various quality parameters, not only in terms of processes but also in terms of durability and performance.



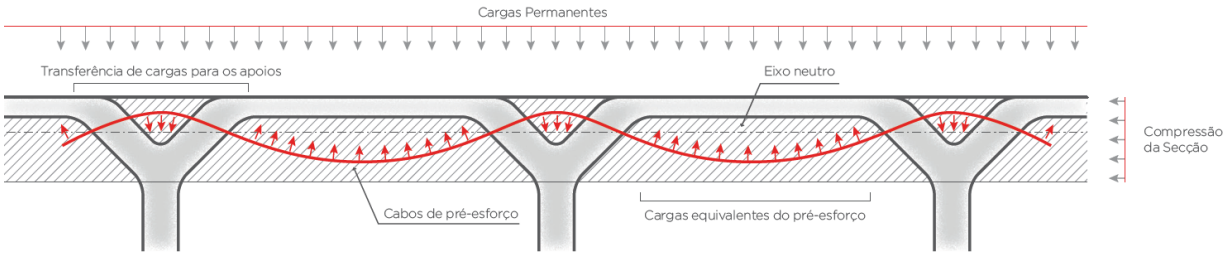
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Principles

Originating from the need to achieve long spans in bridges and engineering structures, prestressing systems, later applied to buildings, represent an innovation in structural design by introducing an active component into structural elements.

Made up of high-strength steel strands, prestressing tendons are installed inside the slab and fixed at their ends in anchorages, then stressed with purpose-designed hydraulic equipment. Thanks to their curved profile in elevation and plan, the forces applied to the tendons transmit to the slab section actions that counteract the effects of gravity loads. The resulting equivalent loads partially balance the design actions and create general compression of the slab section, allowing a reduction in passive reinforcement, the elimination of joints and a greater contribution of the concrete section to the overall resistance of the slab.



Systems

Prestressing systems are essentially classified according to their bond to the concrete, hence the terms bonded and unbonded systems; within these, monostrand and multi-strand systems can also be distinguished.

In unbonded systems, the steel is supplied inside a plastic sheath with no subsequent grouting, whereas in bonded systems the steel is supplied as strand and inserted into a duct that is subsequently grouted with cement grout, giving full bond to the surrounding concrete section.

In terms of use, unbonded monostrand systems are the most commonly applied in slender elements, such as slabs in building construction, while bonded multi-strand systems are used in bridges and, more generally, in larger structural elements.

Sheathed monostrand is an **unbonded system** commonly used in buildings, in which the prestressing tendons consist of a single strand coated with a polyethylene sheath filled with lubricant. This system allows greater eccentricities, lower friction losses and more flexible tendon profiles.

Multi-strand in a circular duct is a **bonded system** in which the prestressing tendons consist of several uncoated strands inserted into a metal duct, which is subsequently grouted with a suitable cement grout. This system allows the full strength of the prestressing steel to be mobilised at the Ultimate Limit State.

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Advantages

The advantages of prestressing systems cover structural considerations (spans, slenderness and performance) as well as economic and environmental ones.

Structural behaviour

- Longer clear spans;
- Fewer columns;
- Reduced structural self-weight;
- Thinner slabs;
- Better deflection control;
- Improved punching shear resistance;
- Reduction or elimination of joints;
- Improved seismic behaviour;

Improved shrinkage behaviour;

Economy

- Lower concrete and steel consumption;
- Savings in vertical elements and foundations;
- Higher commercial value of the large open spaces created;

More parking spaces per m^2;

Sustainability

Lower CO_2 emissions;

- Greater efficiency in the use of natural resources.

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STEEL

Prestressing reinforcement consists of 7-wire strands characterised by high strength and low relaxation. Prestressing steels are generally designated as normal, super and compact, corresponding to cross-sections of 140, 150 and 165 mm^2 respectively. For further information, refer to European standard EN10138.

All anchorage systems produced by **TTM *tension technology*** are certified under the European Technical Approval for the three steel types available on the market: T15C, T15S and T15.





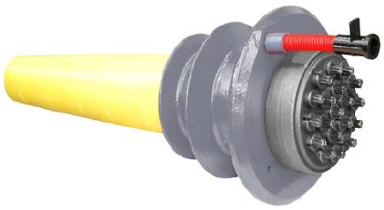
Diameter	Standard	Steel type	Nominal diameter	Nominal area	Mass	Breaking load P_{tk}	Yield load at 1% $P_{t0,1k}$	Relaxation 1000 h	
			mm	mm^2	g/m	kN	kN	%	%
0.6" / T15	EN 10138	Normal	15.2	140	1095	260	230	2.5	4.5
0.6" / T15S	EN 10138	Super	15.7	150	1170	279	248	2.5	4.5
0.6" / T15C	EN 10138	Compact	15.2	165	1290	300	264	2.5	4.5
					Modulus of Elasticity = 196 +/- 10 kN/mm^2				

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SYSTEMS M & D – MULTI-STRAND ANCHORAGES

The "M" system from **TTM *tension technology*** has been designed to fully comply with EAD 160004-00-0301 (formerly ETAG 013) and holds European Technical Assessment ETA 15/0329 and CE marking 1777-CPR-15.07. The system comprises an anchor head, wedges, and a metal trumplate and plastic trumpet. Finite element simulations combined with laboratory testing enabled the design of a particularly compact and efficient anchorage.





The metal trumplates of the "M" series anchorages have a flat face to seat the anchor head, connection holes for the grouting cap and the formwork, and a corrugated grouting port for attaching the grout tube. They are made of EN-GJS 500-7 EN-JS-1050 steel, thus offering high resistance to applied loads. They are weldable, ensuring the highest level of safety during installation. The strands are locked in the anchor head, made of C40-45 UNI EN 10083/1 steel, which has conical holes matching the shape of the retaining wedges, manufactured from 16NiCr4Pb UNI EN 10277-4 grade steel.

The connection between the anchorage and the ducts is made by means of an H.D.P.E. plastic cone, which ensures correct strand deviation and minimises losses. All metal trumplates have threaded holes for fixing to the formwork with threaded rods or bolts.

Corrosion protection

Recognising corrosion protection as a key factor in the long-term performance of prestressing systems, **TTM** has developed in-house a set of integrated systems with several levels of protection, ensuring the durability and reliability of its systems against infiltration and corrosion in highly exposed conditions.

For this purpose, the system offers polyethylene ducts, epoxy-coated or fully polyethylene-encapsulated anchorages, polyethylene caps and accessories that allow grease or grout to be injected in a wide range of situations. Some examples:

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Anchorage **MX**, fully encapsulated in polyethylene, with an injectable protective cap.



MX anchorage

Anchorage **MEP**, protected by epoxy coating and an injectable polyethylene protective cap.



MEP anchorage

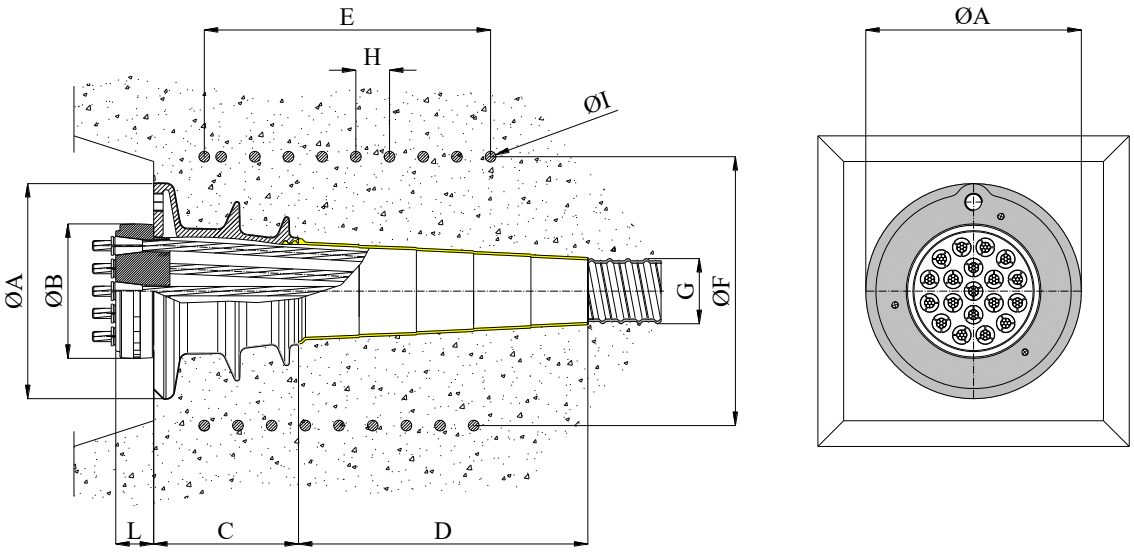
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Anchorage configuration - SYSTEM M



M anchorage dimensions



Type	T15 259 (kN)	T15S 279 (kN)	T15C 307 (kN)	A mm	B mm	C mm	D mm	E mm 35 MPa	F mm 35 MPa	E mm 45 MPa	F mm 45 MPa	G mm	H mm	I mm	L mm
4M15	1036	1116	1228	160	105	103	300	180	170	205	180	45/50	45	12	45
7M15	1813	1953	2149	200	125	133	340	250	220	270	240	62/67	45	12	45
9M15	2331	2511	2763	235	146	163	380	250	250	270	300	72/77	45	14	45
12M15	3108	3348	3684	265	160	180	385	300	300	350	350	80/85	50	16	45
15M15	3885	4185	4605	290	176	197	405	350	355	450	410	85/90	50	16	45
19M15	4921	5301	5833	320	200	215	430	425	400	450	400	95/100	50	16	56
22M15	5698	6138	6754	355	230	260	430	425	420	425	420	100/105	50	18	61
27M15	6993	7533	8289	380	250	277	470	400	460	480	460	110/115	50	18	70

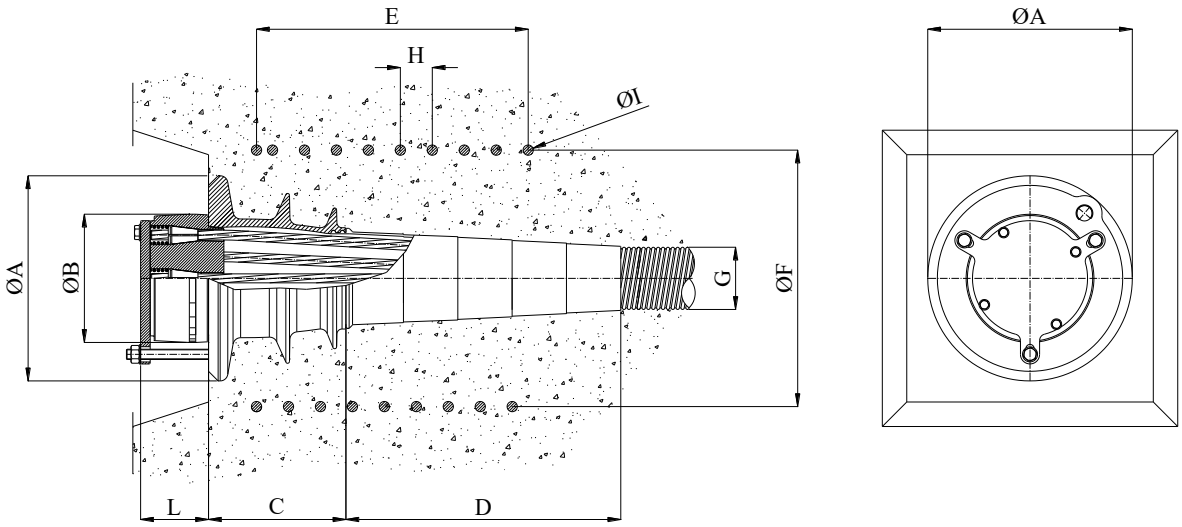
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Anchorage configuration - SYSTEM D



D anchorage dimensions



Type	T15 259 (kN)	T15S 279 (kN)	T15C 307 (kN)	A mm	B mm	C mm	D mm	E mm (35 MPa)	F mm (35 MPa)	E mm (45 MPa)	F mm (45 MPa)	G mm	H mm	I mm	L mm
4D15	1036	1116	1228	160	105	103	300	180	170	205	180	45/50	45	12	90
7D15	1813	1953	2149	200	125	133	340	250	220	270	240	62/67	45	12	90
9D15	2331	2511	2763	235	146	163	380	250	250	270	300	72/77	45	14	90
12D15	3108	3348	3684	265	160	180	385	300	300	350	350	80/85	50	16	90
15D15	3885	4185	4605	290	176	197	405	350	355	400	410	85/90	50	16	90
19D15	4921	5301	5833	320	200	215	430	425	400	450	440	95/100	50	16	106
22D15	5698	6138	6754	355	230	260	430	425	420	450	480	100/105	50	18	111
27D15	6993	7533	8289	380	250	277	470	400	460	480	530	110/115	60	18	120

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Grouting accessories – System M

The **"M"** anchorages can be grouted in two different ways, and the procedure must be chosen before installation. The two possible grouting methods are:



- Grouting with a temporary or permanent cap;
- Grouting with sealing.

The cap is fitted with a sealing washer fixed to the metal trumplate by means of threaded extension rods, whose length and diameter vary according to the application. A special sealing disc seals the grout in the contact area between the anchor head and the metal trumplate. The disc allows the cap to be rotated to the most favourable position so that the air inside can escape.

The most widely used grouting system consists of reusable caps. This system ensures homogeneous filling, free of air bubbles, when grouting "M" anchorages.

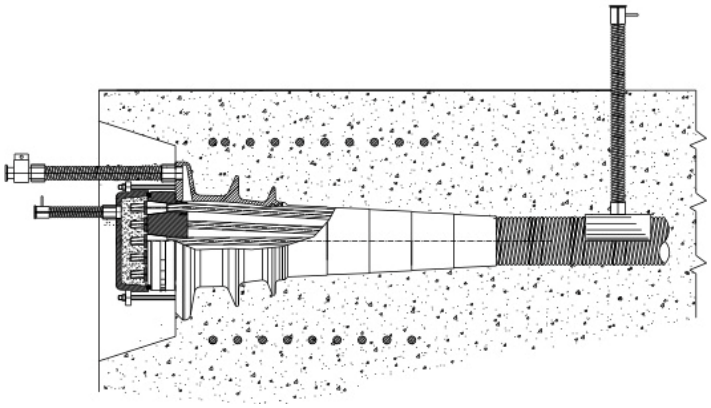


Reusable grouting cap

The metal cap, complete with sealing washer, confines the grout to the face of the anchor head. Grouting is carried out through ¾" or ½" tubes located on the metal trumplate. The mix enters through these ports; the vent is always located on the cap and is fitted with a shut-off valve.

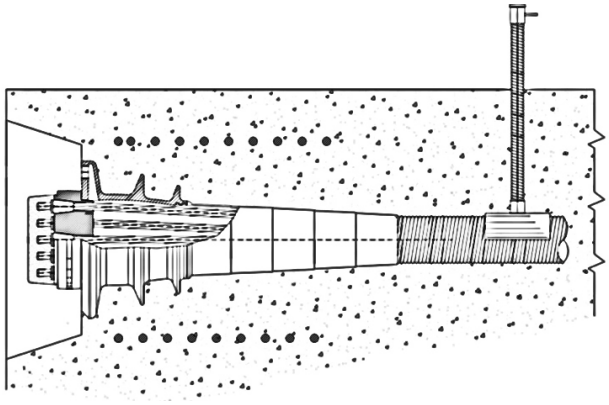
A correctly fitted cap allows grouting under pressure and covers both the wedges and the protruding strand ends. Grouting and the installation of grouting accessories must be carried out by qualified operators.

The reusable cap can be used on various anchor heads



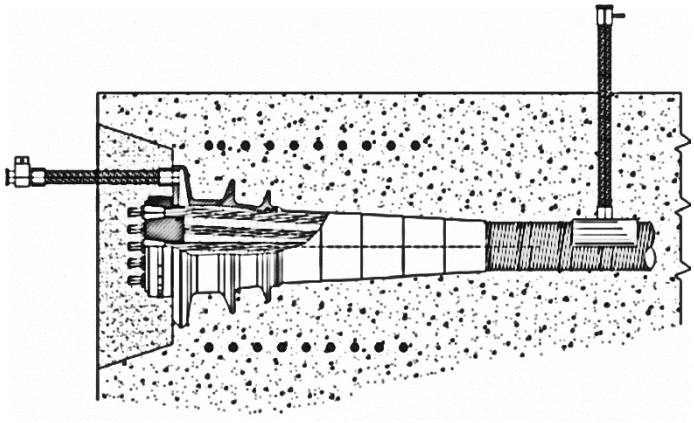
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Grouting with temporary cap

Grouting can be carried out by simply sealing the anchor head with non-shrink mortar, ensuring adequate cover to the metal components of the anchorage.

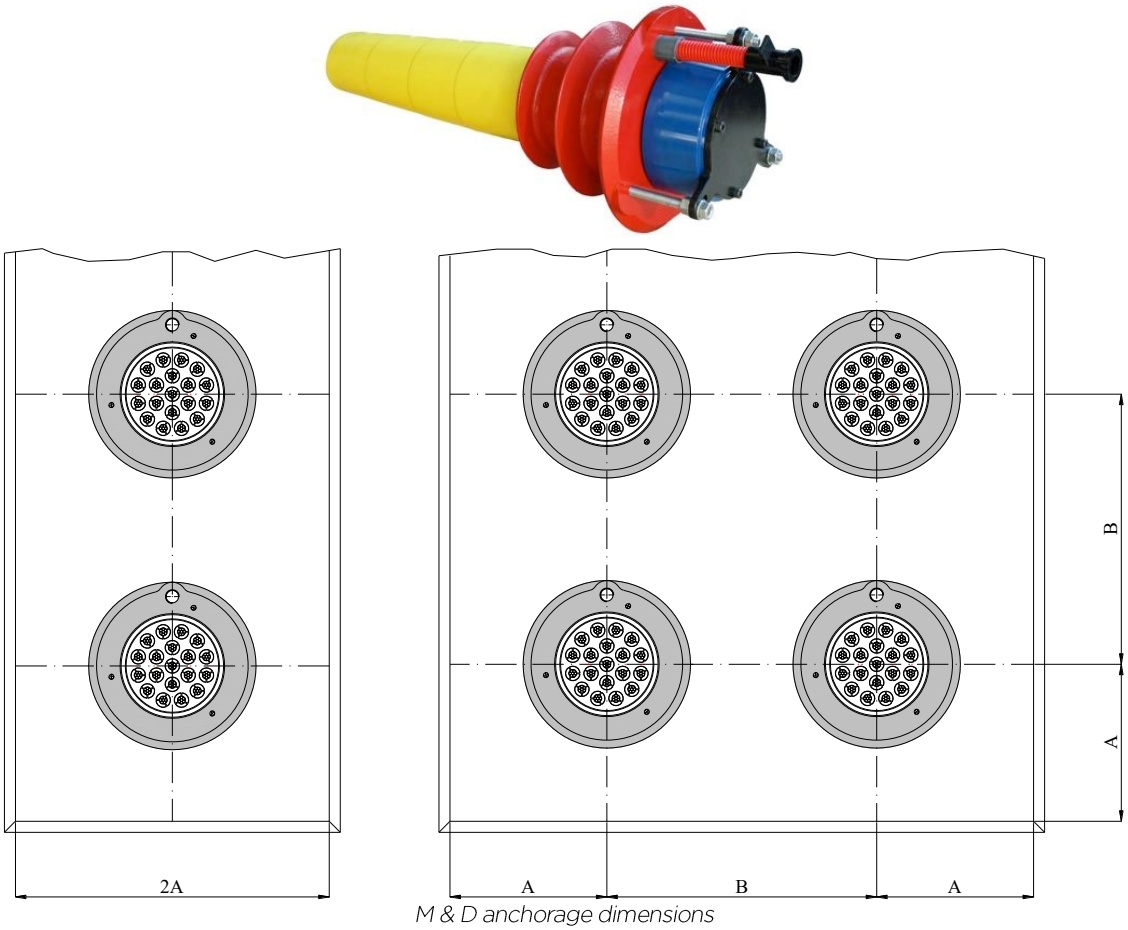


Grouting by sealing

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Edge distances and anchorage spacing - SYSTEM M & D

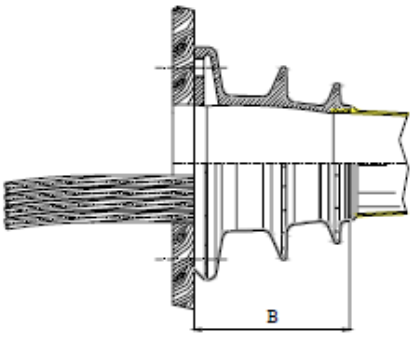


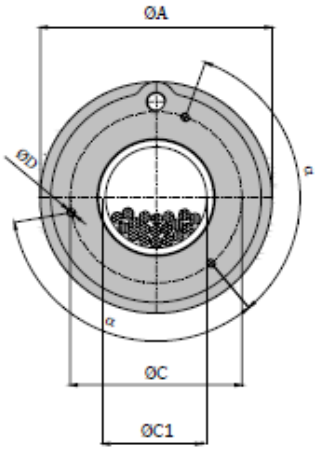
M & D anchorage dimensions

Type	Minimum centre-to-centre spacing B (mm)		Type	Edge distance A (mm)	
	fcmj, cube specimens			fcmj, cube specimens	
	35 MPa	45 MPa		35 MPa	45 MPa
4M15	250	230	4M15	130	120
7M15	335	295	7M15	175	155
9M15	370	320	9M15	190	165
12M15	430	380	12M15	220	195
15M15	480	430	15M15	245	220
19M15	545	485	19M15	280	250
22M15	585	520	22M15	300	265
27M15	650	580	27M15	330	295

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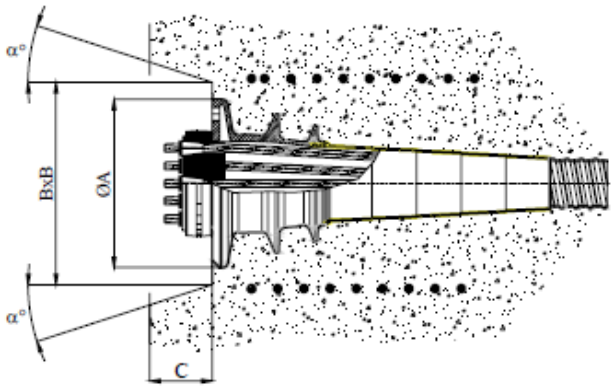
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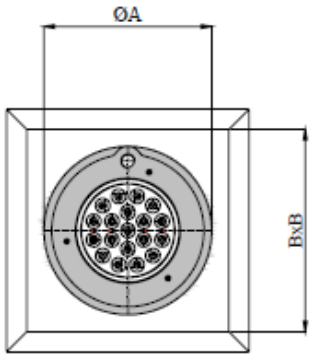






Type	4M15	7M15	9M15	12M15	15M15	19M15	22M15	27M15
A	160	200	235	265	290	320	355	380
B	103	133	163	180	197	215	260	277
C	124	145	190	203	235	237	290	325
C1	82	102	123	137	150	162	195	210
D	M10	M10	M10	M12	M12	M12	M16	M16
a	180°	120°	120°	120°	120°	120°	120°	120°
N.º	2	3	3	3	3	3	3	3





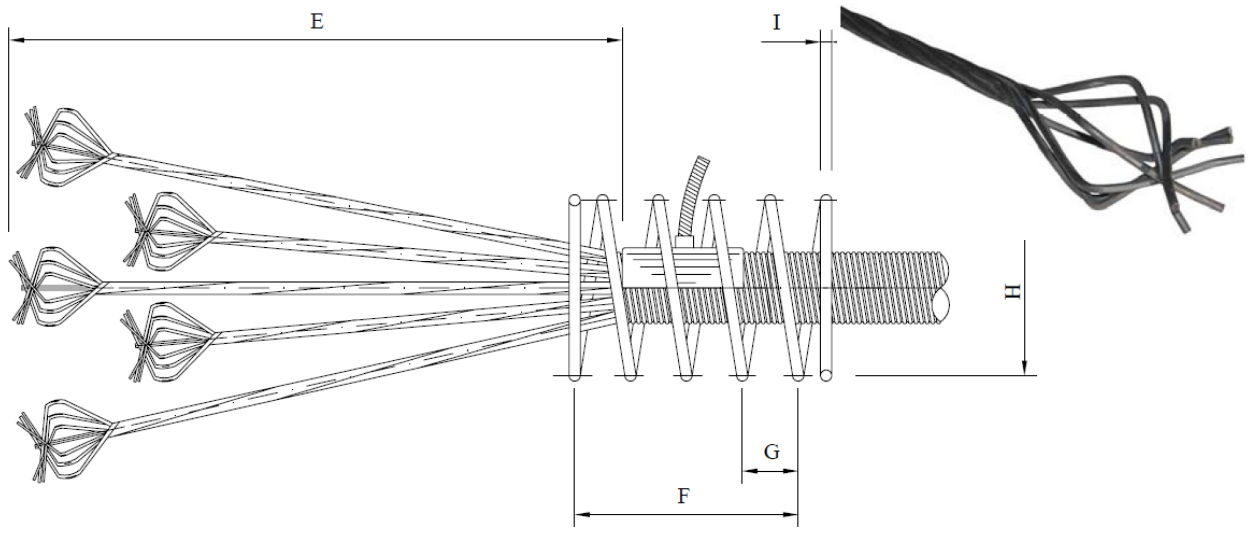
Type	4M15	7M15	9M15	12M15	15M15	19M15	22M15	27M15
A	160	200	235	265	290	320	355	380
B x B	200x200	240x240	275x275	305x305	197	215	260	277
C	110	110	110	110	110	125	130	140
a	15	15	15	15	15	15	15	15

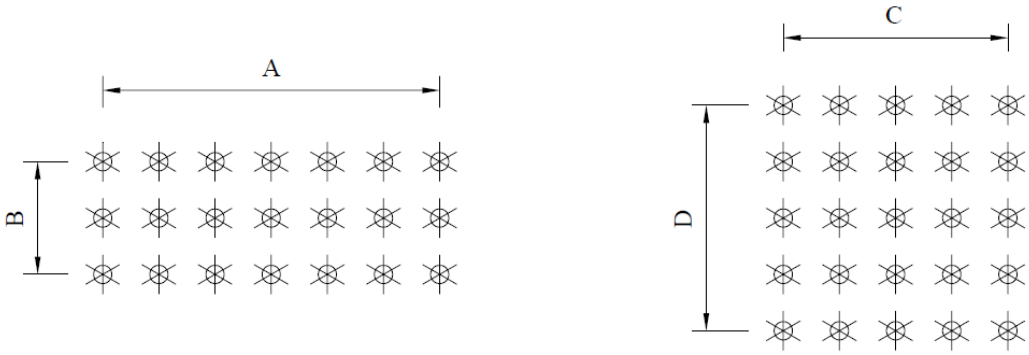
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SYSTEM S – BOND DEAD-END ANCHORAGES

The "S" series dead-end anchorages are produced in full compliance with the applicable regulatory standards. In this type of anchorage, the strands are splayed open at the far end to increase bond to the concrete.





Type	T15 259 (kN)	T15S 279 (kN)	T15C 307 (kN)	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm
4S15	1036	1116	*****	210	-	80	80	800	250	50	100	10
7S15	1813	1953	*****	240	80	-	-	800	350	50	100	10
9S15	2331	2511	*****	-	-	160	160	800	400	60	150	12
12S15	3108	3348	*****	400	80	240	160	800	400	60	150	14
15S15	3885	4185	*****	-	-	320	160	800	400	60	150	14
19S15	4921	5301	*****	-	-	320	240	900	400	70	220	14

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SYSTEM G – COUPLERS



The "G" coupler is used for continuity anchorages and comprises a metal trumplate, anchor head and plastic trumpet, wedges and a metal cover. The plastic trumpets have a flat face to seat the anchor head, connection holes for the anchorage cap and a corrugated grouting port, and are produced in accordance with ETA 21/0263.

The metal trumplates are made of high-strength EN-GJS 500-7 EN-JS-1050 steel. As this steel grade is weldable, maximum safety is ensured during installation.

The strands are locked in anchor heads with conical holes, made of C40-45 UNI EN 10083/1 steel, and the connection between the anchorage and the ducts is achieved by means of a conical H.D.P.E. plastic trumpet.



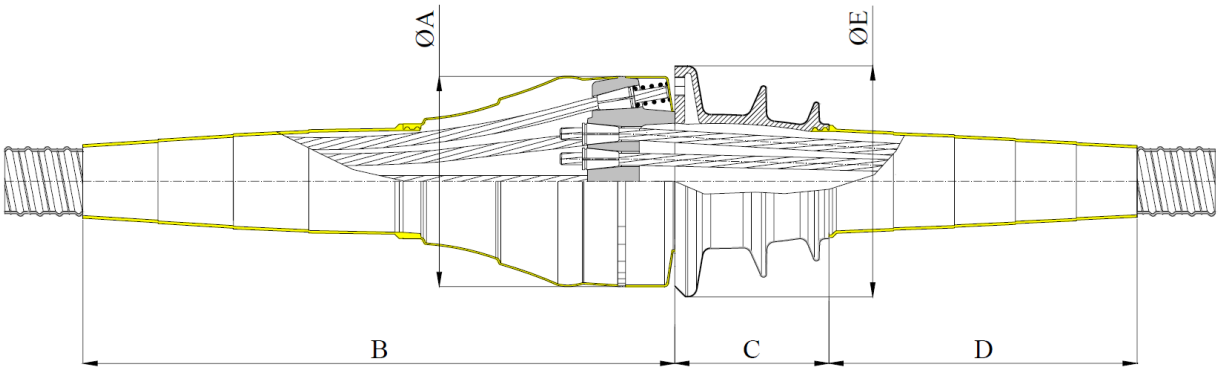
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Configuration of G couplers



G coupler dimensions

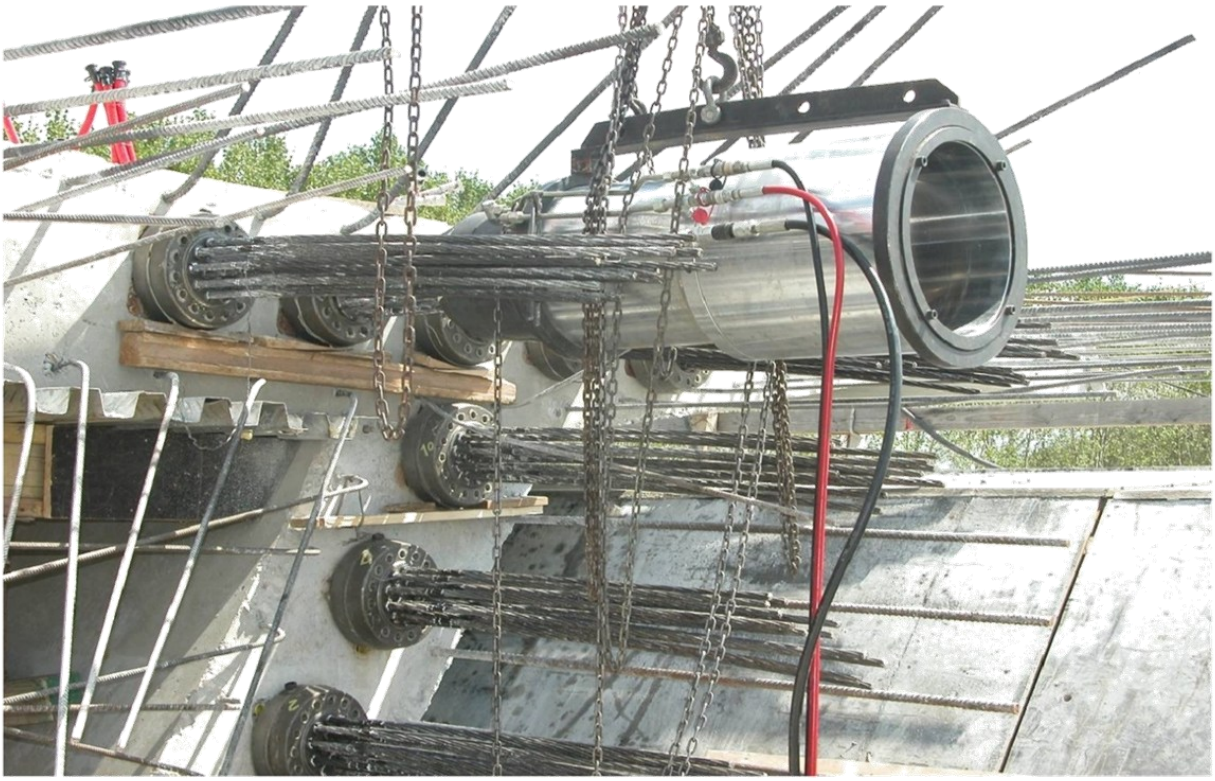


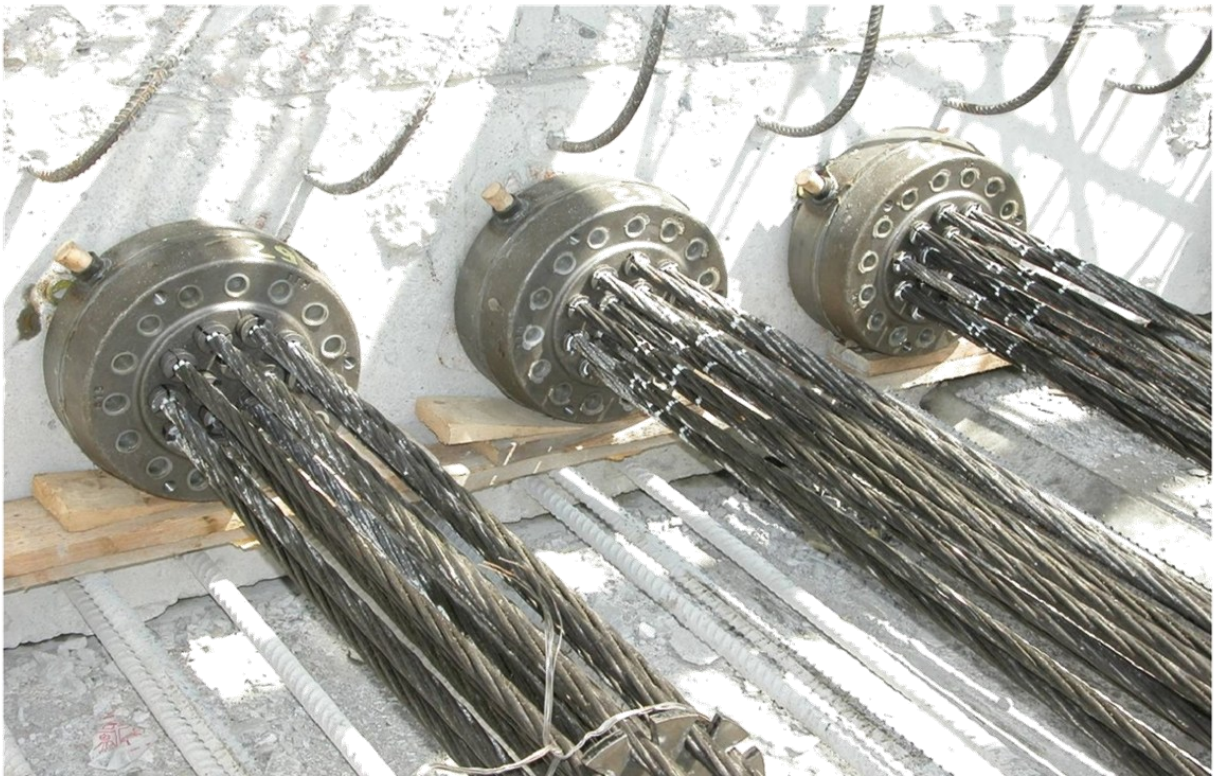
Type	A	B	C	D	E	Diameter
	mm	mm	mm	mm	mm	mm
4G15	155	400	103	300	160	45-50
7G15	215	450	133	340	200	62/67
9G15	235	550	175	350	235	72/77
12G15	248	650	185	385	265	80/85
15G15	265	750	197	430	290	85/90
19G15	280	880	215	430	320	95/100
22G15	315	1000	240	490	355	100/105
27G15	340	1150	277	500	380	110/115

The "G" coupler consists of a machined head with fixing points for the stressing and re-stressing strands (live/dead). The dead-end strands are held by a spring mechanism that keeps the wedge in position from strand threading until the load is applied. The wedge and spring system is protected by a metal cover.

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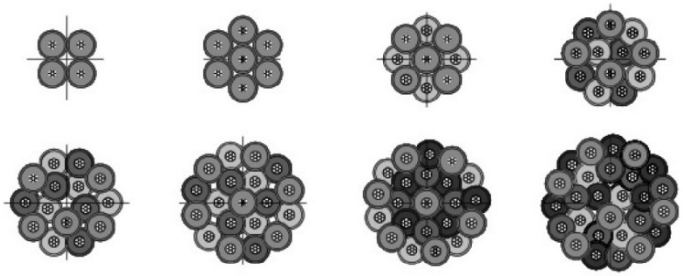




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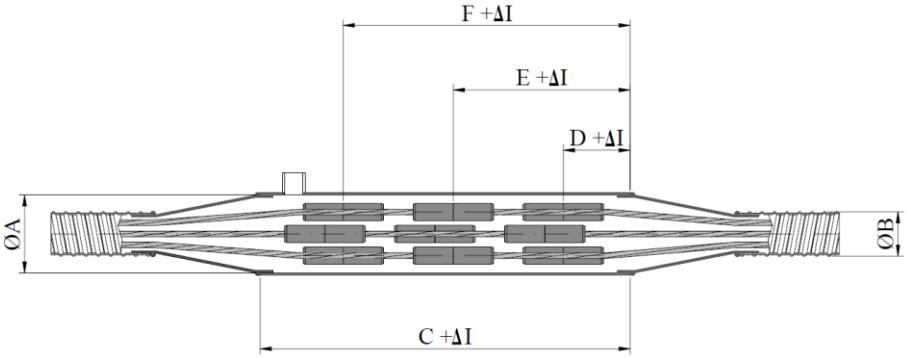
C couplers





Couplers of the "C" series are designed to allow tendons (bonded or unbonded) to be sectioned during bridge construction. The "C" coupler consists of strands locked in pre-assembled gripping wedges held in position by springs, within a duct section of increased diameter to accommodate all the required couplers. The device comprises multiple layers of coupler pairs staggered along the length of the duct, which is provided with a grouting or vent point.





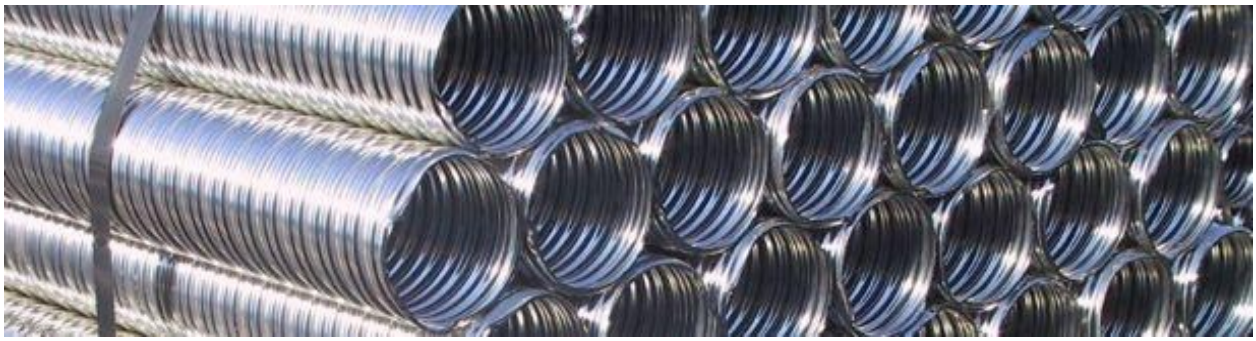
Type	A	B	C	D	E	F
	mm	mm	mm	mm	mm	mm
4C15	140	45/50	675	300	800	
7C15	159	62/67	800	340	800	
9C15	177	72/77	950	400	800	1.200
12C15	193	80/85	1250	400	800	1.200
15C15	193	85/90	1250	400	800	1.800
19C15	193	95/100	1300	400	800	1.800
22C15	219	100/105	1385	400		
27C15	244	110/115	1700	400		

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DUCTS & ACCESSORIES

Metal or polyethylene ducts are the most economical way to create voids in post-tensioned members, providing good secondary corrosion protection and the required bond between the tendons and the concrete. Primary corrosion protection is provided by the alkalinity of the grout and by the concrete itself; secondary protection is provided by the duct and the protective barrier it forms around the tendon.



Circular metal ducts

Metal ducts are available in different versions. They are made of pressed steel strip EN 10139:2016+A1:2020 and may be galvanised. Metal duct sections are 5.8 metres long and are all supplied with a screw coupler on each section. Metal ducts are available in the following types:

- STB-CE, CE marked in accordance with EN 523:2003 and EN 524 (parts 1 to 6),
- STA corrugated, 0.3 mm thick.
- STC corrugated, 0.4 mm thick.
- STD corrugated, 0.5 mm thick.
- STE corrugated, 0.6 mm thick.

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Suggested diameter of corrugated ducts for T15 and T15S strand

Number of strands	Inner diameter	Grouting	Cement	Straight length at anchorage	Minimum radius
	mm	litres/mm	kg/m	mm	mm
4	45	1.2	1.9	500	3000
7	62	2.3	3.6	700	3500
9	72	2.8	4.5	800	4000
12	80	3.6	5.8	1000	4000
15	85	3.8	6.1	1100	4500
19	95	4.7	7.5	1200	5000
22	100	5.2	8.4	1300	5000
27	110	6.2	9.9	1300	5000
37	130	8.6	13.8	1500	6000

"SP" polyethylene ducts



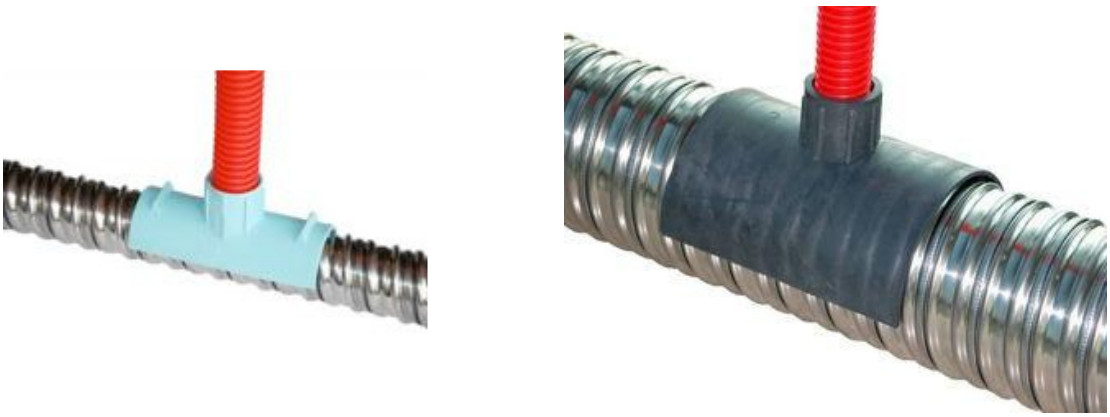
SP polyethylene ducts are available in different forms. They are made of robust H.D.P.E. in accordance with fib specifications (Bulletin 75), in sections of variable length from 5.8 m to 11.8 m. They are blue and come with a heat-shrink coupler at each joint. SP ducts can be supplied in the following types:

- SPA corrugated, 2.00 mm thick.
- SPB corrugated, 2.50 mm thick.
- SPB corrugated, 3.00 mm thick.
- SPD corrugated, 3.50 mm thick.

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Vent base



Vent base

Placing vents on corrugated ducts ensures that the air inside is properly removed during grouting. They must be installed at all points along the tendon where air pockets may form. The DD-1001 vent is made of flexible material so that it can be used with ducts of all diameters.

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Grouting accessories



The "M, M_{EP}® and MX ®" anchorages are supplied with a central grouting port, located at the highest point to ensure correct grouting with no voids. All trumplates have threaded holes for fixing to the formwork or to the protective cap (live/dead).



Tendons are grouted and vented using various systems designed to make site operations as simple as possible, including front grouting through rigid PVC tubes and flexible solutions using corrugated polyethylene tubes. There are no particular specifications governing the choice of system, so it should be defined according to site needs and conditions.



The front grouting/vent port can be connected via a connector for 25 mm or 20 mm diameter corrugated tubes, for grouting or venting with limited grout flow.



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The DD20x25 corrugated tube connector joins two tubes that have been improperly interrupted and allows them to be restored by providing continuity. This device is generally used to repair broken tubes inside a slab and to maintain grouting pressure.



Reusable valves that shut off the grout flow and can be connected directly to 20 or 25 mm diameter corrugated tubes; they can be reused if oiled beforehand.



Corrugated and rigid grouting tubes and all the connections and valves required for grouting

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Strand bullets



DD-2015-PU and TT-5077 strand bullets

DD-2015-PU polypropylene strand bullets are designed to prevent damage to the ducts caused by contact with the front end of the steel strand during threading and to make strand insertion easier. They can be used with T15, T15S and T15C steel and are reusable.

TT-5077 strand bullets are designed for difficult threading operations. They are made of steel and contain a gripping wedge for T15 strand. The TT-5077 bullet is recommended where threading is complex and plastic bullets break due to friction caused by tortuous tendon profiles, as it offers greater impact resistance.

The TT-5077 bullet is most advantageous when combined with threading by a high-power pushing unit. If the bullet is lost inside the duct, subsequent threading will be hindered, as its presence obstructs the strands.



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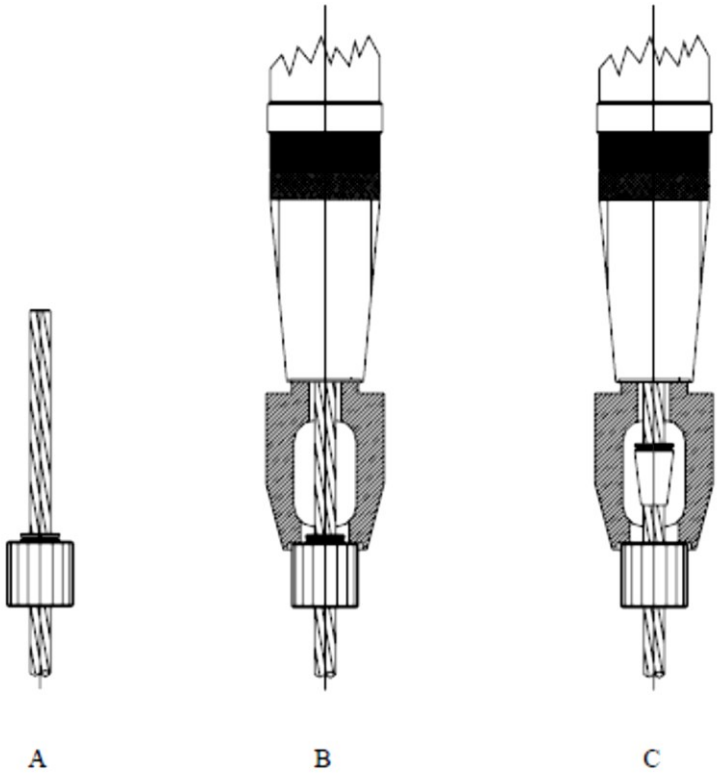
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Wedge release table

The TR-15 and TM-15 wedge release tables allow tendons to be de-tensioned for replacement, or for wedge replacement, on all anchorages in the TTM range, and are compatible with monostrand stressing equipment.



TR-15 and TM-15 wedge release tables



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EQUIPMENT



The "M" series hydraulic jacks from **TTM *tension technology*** are available in nine models that differ according to their intended use. They are supplied with an automatic wedge seating system and ten-metre flexible hoses, and are also fitted with a rotation system around their axis. The jacks are equipped with a metal support to achieve the inclination required for stressing operations. The support is completed by two fixing points that allow the jack to rotate around its own axis, making it easier to insert the strands into the equipment. The piston stroke and rotation capability allow quick operation with minimum effort during stressing.



Specifications	U.M.	M 1600 kN	M 1800 kN	M 3000 kN	M 3600 kN	M 4800 kN
Capacity	**kN**	1600	1800	3000	3600	4800
Strand range	**No.**	1-4	4-7	7-12	12-15	15-19
Wedge seating piston	**mm**	250	250	250	250	250
Weight	**kg**	180	210	280	390	490
Piston area	**cm^2**	155.51	302.20	424.49	564.21	725.71
Stressing pressure	**Bar (max.)**	700	700	700	700	700
Return pressure	**Bar (max.)**	250	250	250	250	250
Wedge seating pressure	**Bar (max.)**	250	250	250	250	250
Piston stroke	**mm**	400	400	400	450	500
Maximum diameter	**Mm**	290	330	400	470	520
Length	**mm**	950	1050	1000	1150	1150

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All M series jacks are supplied complete with the accessories needed for stressing. The jacks are classified by type, e.g. M6800KN, and, if the core differs from the factory standard, M6800KN-22 (22 strands). The jacks are operated by three hoses from the hydraulic pumps, providing the following individual functions:

- Stressing,

- Return,

- Wedge seating.

All jacks require a strand guide (star) to ease insertion onto the tendon to be stressed. For stressing live anchorages, all jacks require a bearing ring on the jack nose. Only on G-type anchorages does the jack bear directly on the anchorage.



27-strand star



M 4800-19 jack

The main features of the "M" series jacks are:

- 350° rotation about one axis,
- Reduced tendon length required,
- Automatic wedge seating via hydraulic circuit
- Compact dimensions,
- Front grip,
- Easy handling and maintenance,
- Easy inspection/cleaning of the gripping wedges

The jacks are identified by a serial number and come with the corresponding calibration certificate.

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M 6800 kN – 27



M 3000 kN – 12



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Hydraulic Pumps

TTM650

Power: 7.5 kW

Weight: 290 Kg

Control: push-button pendant

Functions: stressing-wedge seating-return

Max. stressing pressure: 550 bar.

Max. wedge seating pressure: 150 bar.

Max. return pressure: 150 bar.

Dimensions: 1500x900x700 mm

Hydraulic hoses: three



TTM1000

Power: 10 KW

Weight: 380 Kg

Control: push-button pendant

Functions: stressing-wedge seating-return

Max. stressing pressure: 550 bar.

Max. wedge seating pressure: 150 bar.

Max. return pressure: 150 bar.

Dimensions: 1400x730x1400 mm

Hydraulic hoses: three



TTM2000

Power: 22 KW

Weight: 470 Kg

Control: push-button pendant

Functions: stressing-wedge seating-return

Max. stressing pressure: 550 bar.

Max. wedge seating pressure: 150 bar.

Max. return pressure: 150 bar.

Dimensions: 1400x730x1400 mm

Hydraulic hoses: three



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Grout Pump

The "T" grout pump is designed to ensure maximum versatility in meeting site needs and for use in harsh conditions. It is supplied with wheels so that it can be towed on site, and is equipped with all the safety devices required for its use. The machine has two tanks, one for mixing the grout and the other for storing the mix. The mixer turbine runs at 1500 rpm. The grout pumps come as standard with a pressure gauge and guard, and can be operated by a push-button pendant with a ten-metre extension cable.



"T" grout pump

Specifications		Model T500	Model T400
Weight	**kg**	900	900
Dimensions	**mm**	1900x1500x1900 mm	1900x1500x1900 mm
Mixer	**l**	190 litres	190 litres
Mixing time	**sec**	40"	40"
Agitator	**l**	200 litres	200 litres
Grouting pressure	**Bar**	10-20 bar.	10-20 bar.
Max. grouting capacity	**l/min**	25-40 litres/minute	15-25 litres/minute
Mixer power	**kW**	10 kW	10 kW
Pump power	**kW**	75 kW	75 kW

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