

REALIZE YOUR IDEAS, SUPPORT YOUR SOLUTIONS.

Applications	Structure's Type
Freeway Daura-Yusufiyah, Iraq	Highway
Banegas Bridge, Bolivia	Highway
Intersection of King Abdullah with King Khalid Road,KSA	Highway
Perjakaryu Elevated HighWay, Java, Indonesia	Highway
East corridor,Qatar	Highway
The Wuhan-Guangzhou Passenger Dedicated Line, China	Highway
GreenLine Metro, Qatar	Railway
Hainan East Railway, China	Railway
Construction of Matara - Beliatta Sector Phase I of Matara – Kataragama Railway Extension Project, Sri Lanka	Railway
Makkah Metro, Saudi Arabia	Railway
Shanghai Maglev Viaduct, China	Viaduct
Central-Wan Chai Bypass, Hong Kong	Bypass
Mangere Digest No.8 Reservoir,New Zealand	Bridge
KD Bridge, Korea	Bridge
Neelum-Jhelum Hydraulic Power Station, Pakistan	Bridge
East Sea Bridge, China	Bridge
Sungai Bridge, Korea	Bridge
Benazir Bhutto International Airport Islamabad, Pakistan	Airport
Sabah Al Salem University City, Kuwait	Building
Residential Buidling at Al Mahboula, Kuwait	Building
The cement plant, Guatemala	Building



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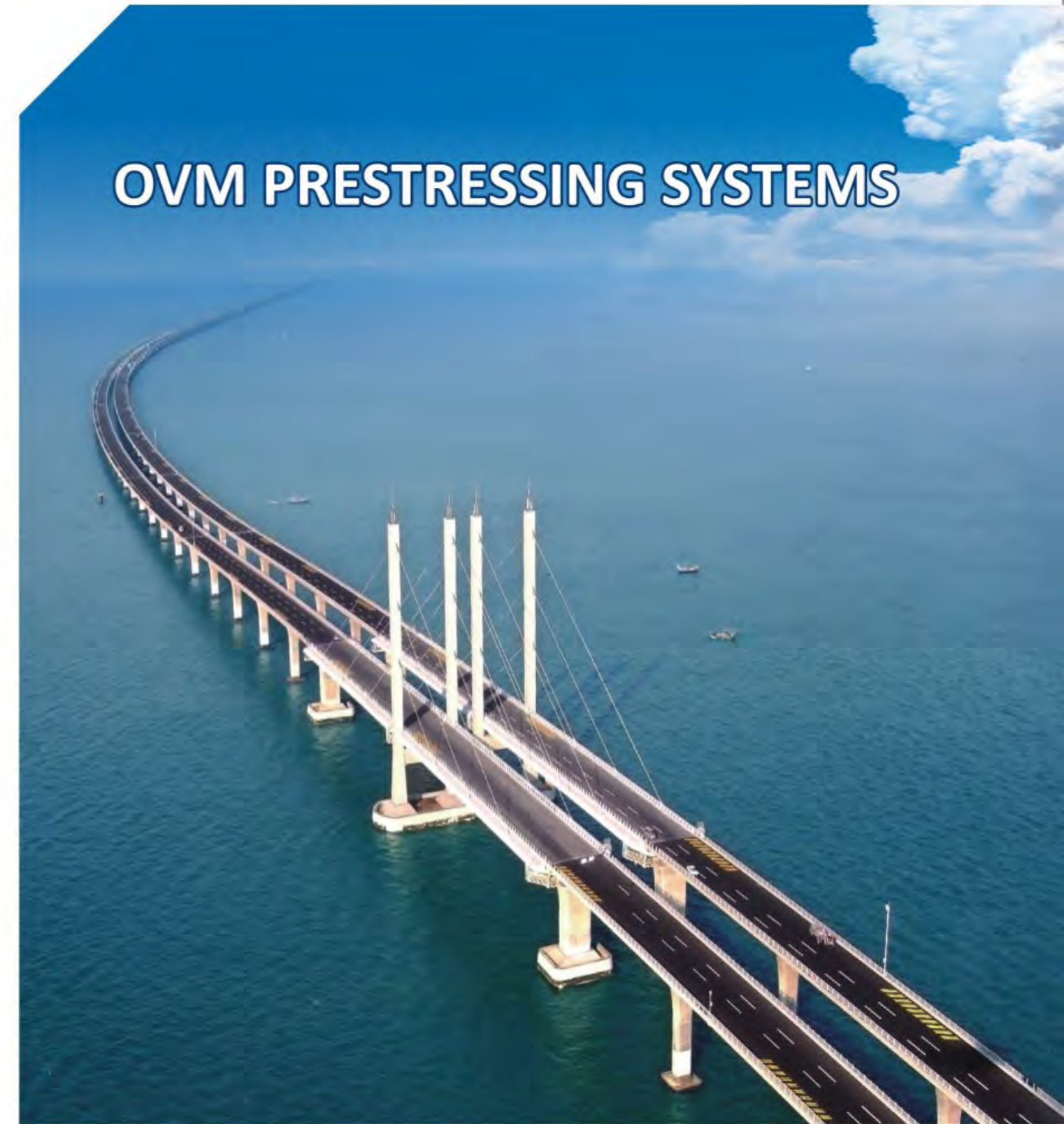
www.ovm.cn www.ovmchina.com

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张美英设计 0772-2818124



OVM PRESTRESSING SYSTEMS



LIUZHOU OVM MACHINERY CO., LTD.

www.ovm.cn



■ **Asia**

- China
- Japan
- Korea
- Myanmar
- Malaysia
- Singapore
- Taiwan
- Vietnam
- Hong Kong
- India
- Indonesia
- Iran
- Pakistan

■ **Middle East and North Africa**

- Algeria
- Egypt
- Tunisia
- Sudan
- Saudi Arabia
- Dubai
- Jordan
- Kuwait
- Morocco
- Oman
- Qatar
- Abu Dhabi

■ **The America**

- Colombia
- Ecuador
- Bolivia
- Panama

■ **Europe**

- Czech republic
- Turkey

■ **Oceania**

- Australia
- Zew Zealand

Wholly owned subsidiaries

OVM International Ltd.

OVM Cable Products Co., Ltd.

Orient Engineering Rubber Products Co., Ltd.

OVM Engineering Co., Ltd.

OVM Structure Monitoring Technology Co., Ltd.

Holding subsidiaries

Hong Kong OVM Engineering Company Ltd.

Siping OVM Machinery Co., Ltd.

Hubei OVM Cable Products Co., Ltd.

LIUGONG

OVM

Liuzhou OVM Machinery Co., Ltd.
Headquarter in Liuzhou, China

- + With sophisticated experience in prestressing industry
- + With expertise on technical R&D on bridge construction appliance
- + With ISO9001-2008 quality management system
- + Products complying with AASHTO, ASTM, BS, ETA, FIP, GB, JIS, etc.
- + PT satisfies certificate ETA-10/0307

OVM tops the Chinese prestressing industry

Thanks to 50 years of experience, OVM is now a leading product supplier and specialist contractor in China in the field of prestressing and other special construction techniques. Enjoying with a high reputation on its reliability, professionalism and innovation, OVM's series technology and products have successfully applied on numerous projects, including of bridges, highways, high-speed railways, buildings, dams, nuclear power plants, LNG, and have achieved worldwide acknowledgments.

Sufficient R&D

By implementing it as a basic company strategy, more than 5% of annual our turnover is invested on technical R&D. OVM owns a national technology center and a postdoctoral research workstation and maintains close cooperative relationships with lot of renowned universities and institutions in China. OVM has achieved 480+ technical patents by 2014.

Big inventory of products

OVM focuses on developing outstanding prestressing technology and building up renowned brand in civil engineering field. As the biggest supplier in China, OVM provides a big inventory of prestressing systems including 5 categories, 30 series and more than 420 types of products, i.e.:



We value:

- Innovation
- Efficiency
- Reliability
- Performance
- Care for people

- I. OVM Post-tensioning Systems
- II. OVM Cable Systems (MS & PWS Cables)
- III. OVM Construction Solutions (Incremental Launching, Turning and Heavy Lifting)
- IV. OVM Bearings & Expansion Joints
- V. OVM Monitoring Systems

requirements in major Standards: e.g. AASHITO, ASTM, BS, EN, ETA, FIP, GB, JIS, PTI etc. Meanwhile, OVM has delivered extensive tests in the international independent test organizations and has made significant technical improvement on its products.

Yours truly dependable partner

With worldwide network, OVM strives continually to provide high quality services to clients, devotes to be a domestic leading and internationally renowned systemics solution provider and is keen to setup partnerships on prestressing engineering design, supplying of prestressing systems, engineering sub-contracting, as well as special structures construction.

Certified management and products

The durable and reliable OVM products are guaranteed by outstanding managements. OVM is certified with ISO9001-2008 Quality Management System by BSI and CQC. The overall production process is strictly executed quality control programs. OVM products satisfy

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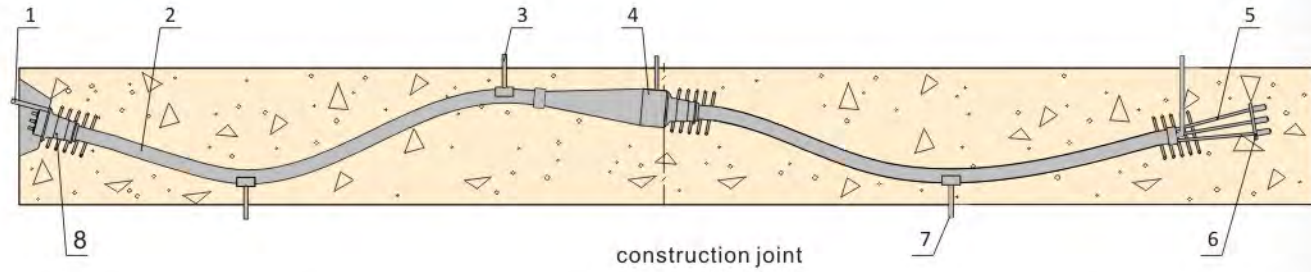


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Shanghai Yangtze River Bridge, China

OVM Post-tensioning System



1.Grout tube 2.Duct 3.Vent 4.Coupler 5.Dead-end anchorage type P (alternatively) 6.Anchor plate 7.Grout 8.Stressing anchorage

OVM Post-tensioning System consists of anchorage (stressing-end, dead-end), coupler, strand, duct, ect. OVM post-tensioning systems match strands with various diameters:

12.5/12.7/12.9mm, 15.24/15.3 /15.7mm, 21.8mm, 28.6mm.

They feature in:

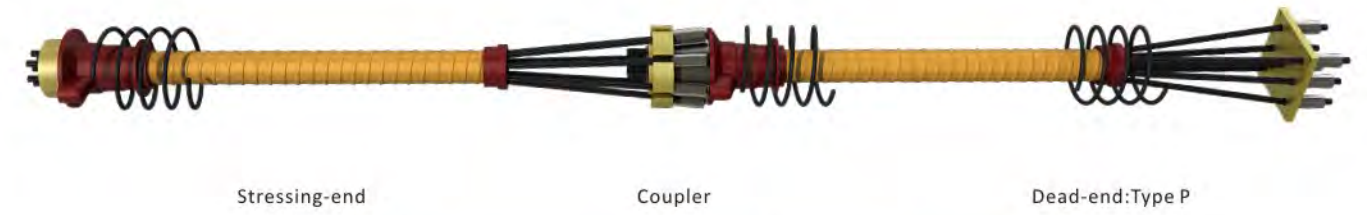
- Adaptable for strand with various strength such as 1570/1670/1770/1860/2000MPa.
- Full range of tendon sizes are available (1~ 55 strands and other sizes could be customized upon demands).

- High anchoring coefficient, reliable and stable.
- Various identical accessories available upon particular requests.
- Comply with the international specifications and recommendations ASTM, AASHTO, FIP, EOTA, BS, etc.
- Simple and reliable equipment for installation, tensioning and grouting.

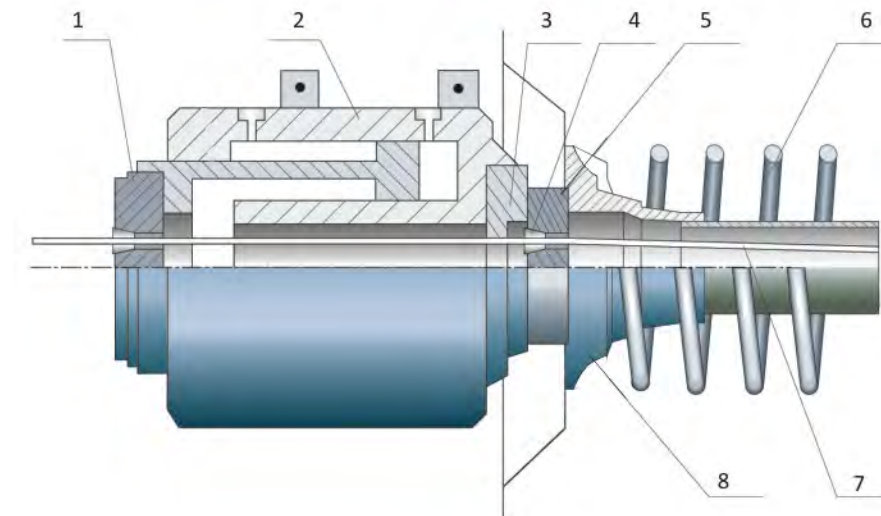


Turbiah Interchange Project
KSA 2009
Post Tensioned Girders 35 meter Span
Main Contractor AL Omier

Integral Assembly of OVM Post-tensioning System

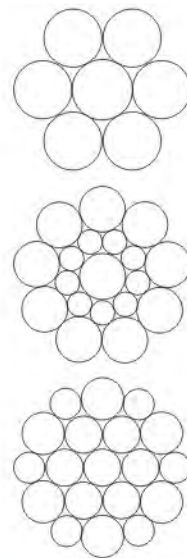


Capable of stressing at both ends as per design



1.Tool anchorage 2.Jack 3. Spacer 4. Wedge 5. Anchor head 6. Spiral reinforcement 7. Strand 8.Bearing plate

Strand



Cross-section of 13/15/18mm strand

Cross-section of 22mm strand

Cross-section of 28mm strand

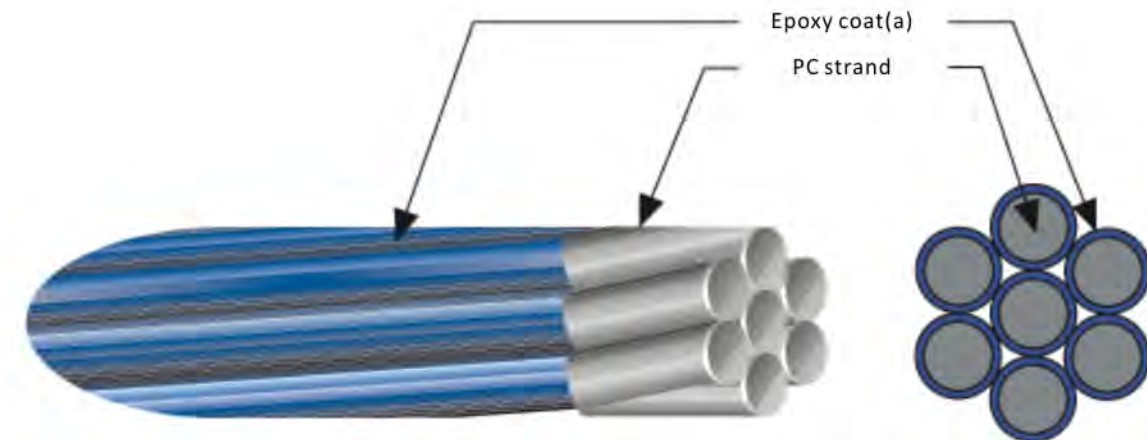
The strand to fit OVM Post-tensioning System should comply with ASTM416, GB/T 5224, prEN 10138 or JIS G3536. The strand could be bare, galvanized or epoxy-coated.

Main Data

Type	13mm (0.5")				15mm (0.6")				
	prEN 10138-3 (2006) Y1860S7	ASTM416-12 Grade 270	GB/T 5224-2003	prEN 10138-3 (2006) Y1860S7	ASTM416-12 Grade 270	GB/T 5224-2003	prEN 10138-3 (2006) Y1860S7	ASTM416-12 Grade 270	GB/T 5224-2003
Nom. Dia. (mm)	12.5	12.9	12.7	12.7	15.3	15.7	15.24	15.2	15.2
Nom. Cross Section (mm ²)	93	100	98.7	98.7	140	150	140	140	140
Nom. Mass (Kg/m)	0.726	0.781	0.775	0.775	1.093	1.172	1.102	1.101	1.101
Nom. Yield Strength (MPa)	1634	1640	1675	1636	1640	1676	1636	1640	1676
Nom. Tensile Strength (MPa)	1860	1860	1860	1860	1860	1860	1860	1860	1860
Min. Breaking Load (kN)	173	186	183.7	184	260	279	260.7	260	260
Young's Modulus (Gpa)	Approx. 195								
Relaxation after 1,000h at 20° C at 70% breaking load	Max. 2.5								

Type	18mm	22mm	28mm
Designation	JIS G3536-2008	JIS G3536-2008	JIS G3536-2008
Nom. Dia. (mm)	17.8	21.8	28.6
Nom. Cross Section (mm ²)	208.4	312.9	532.4
Nom. Mass (Kg/m)	1.652	2.482	4.229
Min. Breaking Load (kN)	387	573	949
Young's Modulus (Gpa)	Approx. 195		
Relaxation after 1,000h at 20° C at 70% breaking load	Max. 2.5		

Epoxy-Coated PC Strand



- With excellent anti-corrosion property
- Good UV resistance
- Same strength and mechanical property as bare strand
- Extending service life of the strand

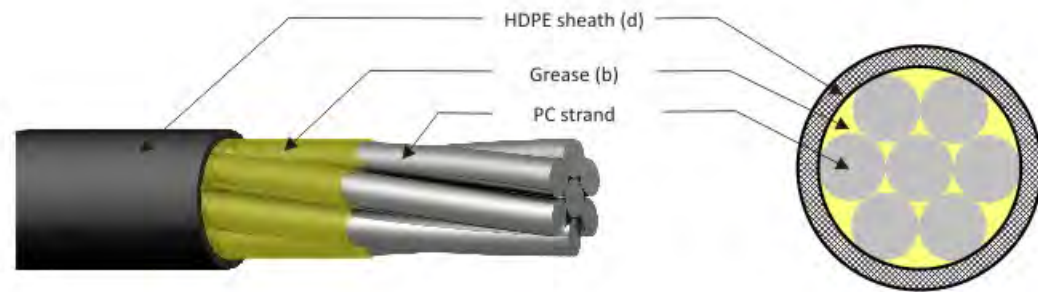
Epoxy-coated Strands have widely applied to severe environments such as for marine structures or those at salty intensive area.

Epoxy-Coated PC Strand

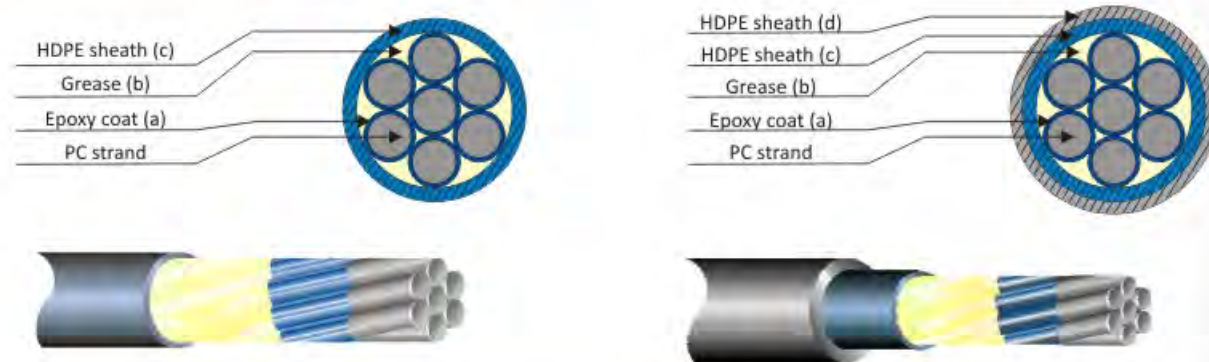
Type	PC strand		OVM EC S13/ EC S15				
	Spec. (mm)	Unit Weight (g/m)	External dia.(mm)	Unit Weight (g/m)	Coating Thickness on Single wire (mm)	Unit weight of Coasting (g/m)	Material
OVM EC S13	12.7	775	13.5	789	0.13-0.30	14.9	Epoxy
OVM EC S15	15.2	1102	16.0	1119	0.13-0.30	17.7	

Unbonded Strand

Bare Unbonded Strand



Epoxy-Coated Unbonded Strand



Single Layer PE Sheathed

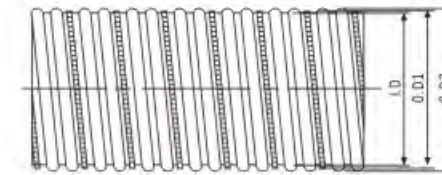
Type	PC strand		UPS13E/15E							
	Spec. (mm)	Unit weight (g/m)	External dia. (mm)	Unit weight (g/m)	Thickness (mm)		Weight of grease (g/m)	Material		
					a	c		b	a	b
UPS13E	12.7	775	≥15.6	887	0.13-0.30	≥1.0	≥43	Epoxy	Grease	HDPE
UPS15E	15.2	1102	≥18.1	1235	0.13-0.30	≥1.0	≥50			

Double-layer PE Sheathed

Type	PC strand		UPS13E2/15E2									
	Spec. (mm)	Unit weight (g/m)	External dia. (mm)	Unit weight (g/m)	Thickness (mm)			Weight of grease (g/m)	Material			
					a	c	d		b	a	b	c
UPS13E2	12.7	775	≥16.9	912	0.13-0.30	≥1.0	0.8-1.0	≥43	Epoxy	Grease	HDPE	HDPE
UPS15E2	15.2	1102	≥19.7	1270	0.13-0.30	≥1.0	0.8-1.0	≥50				

Galvanized Steel Sheet Corrugated Duct

Round Duct



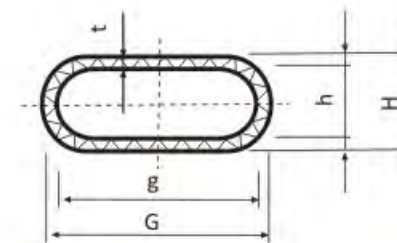
Main Data

Unit:mm

Spec.	Duct			Specs	Duct		
	I.D	O.D1	O.D2		I.D	O.D1	O.D2
2B40(Zn)	40	42.5	45.5	2B90(Zn)	90	92.5	95.5
2B45(Zn)	45	47.5	50.5	2B95(Zn)	95	97.5	100.5
2B50(Zn)	50	52.5	55.5	2B100(Zn)	103	102.5	105.5
2B55(Zn)	55	57.5	60.5	2B105(Zn)	105	107.5	110.5
2B60(Zn)	60	62.5	65.5	2B110(Zn)	110	112.5	115.5
2B65(Zn)	65	67.5	70.5	2B115(Zn)	115	117.5	120.5
2B70(Zn)	70	72.5	75.5	2B120(Zn)	120	122.5	125.5
2B75(Zn)	75	77.5	80.5	2B125(Zn)	125	127.5	130.5
2B80(Zn)	80	82.5	85.5	2B130(Zn)	130	132.5	135.5
2B85(Zn)	85	87.5	90.5	2B135(Zn)	135	137.5	140.5

I.The adjacent bigger duct can be used as the coupler. II. Special duct can be supplied on request.

Flat Duct



Main Data

Unit:mm

Specs	Duct					Specs	Duct				
	g	G	h	H	t		g	G	h	H	t
2B50B(Zn)	50	56	19	25	3	2B70B(Zn)	70	76	19	25	3
2B60B(Zn)	60	66	19	25	3	2B90B(Zn)	90	96	19	25	3

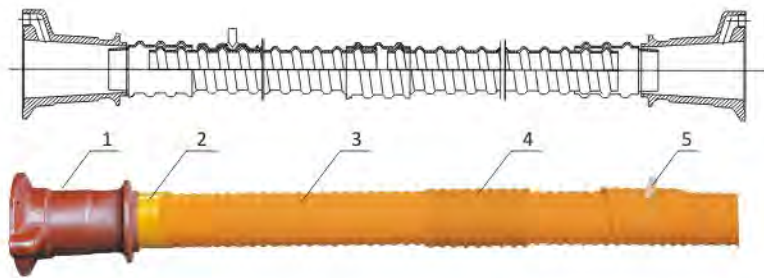
I.The adjacent bigger duct can be used as the coupler. II. Special duct can be supplied on request.

Plastic Duct

Plastic ducts are made of HDPE material, it features:

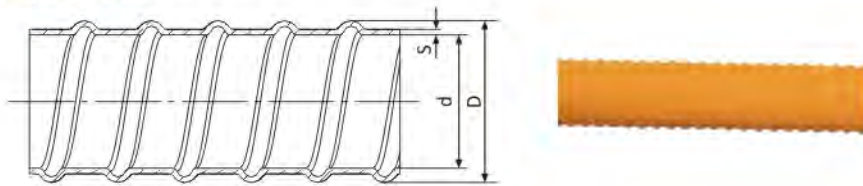
- Lower friction
- Excellent sealing property
- Better anti-corrosion performance
- More flexible during assembling.

Plastic Duct Assembly



1.Bearing plate 2.OLT coupler 3.Plastic duct 4.OLG coupler 5.Vent

Round Plastic Duct

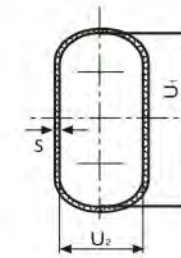


Main Data (Round Duct)

Unit:mm

Designation	d	D	s
SBG-50	φ 50	φ 65	2.5
SBG-55	φ 55	φ 70	2.5
SBG-60	φ 60	φ 75	2.5
SBG-65	φ 65	φ 80	2.5
SBG-70	φ 70	φ 86	2.5
SBG-75	φ 75	φ 92	2.5
SBG-80	φ 80	φ 97	2.5
SBG-85	φ 85	φ 102	2.5
SBG-90	φ 90	φ 106	2.5
SBG-95	φ 95	φ 112	2.5
SBG-100	φ 100	φ 122	2.5
SBG-110	φ 110	φ 132	3
SBG-120	φ 120	φ 142	3
SBG-130	φ 130	φ 154	3
SBG-140	φ 140	φ 164	3

Flat Plastic Duct

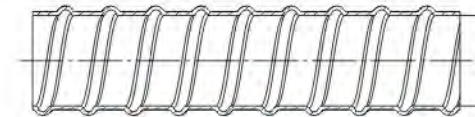


Main Data (Flat Duct)

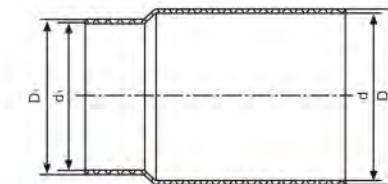
Unit:mm

Designation	U1	U2	s	Anchorage adapted
OVM SBGB-41	41	22	2.5	BM15(13)-2
OVM SBGB-60	60	22	2.5	BM15(13)-2~3
OVM SBGB-72	72	23	2.5	BM15(13)-4
OVM SBGB-90	90	23	2.5	BM15(13)-5

Coupler (OLG)



OLG coupler



OLT coupler

Main Data

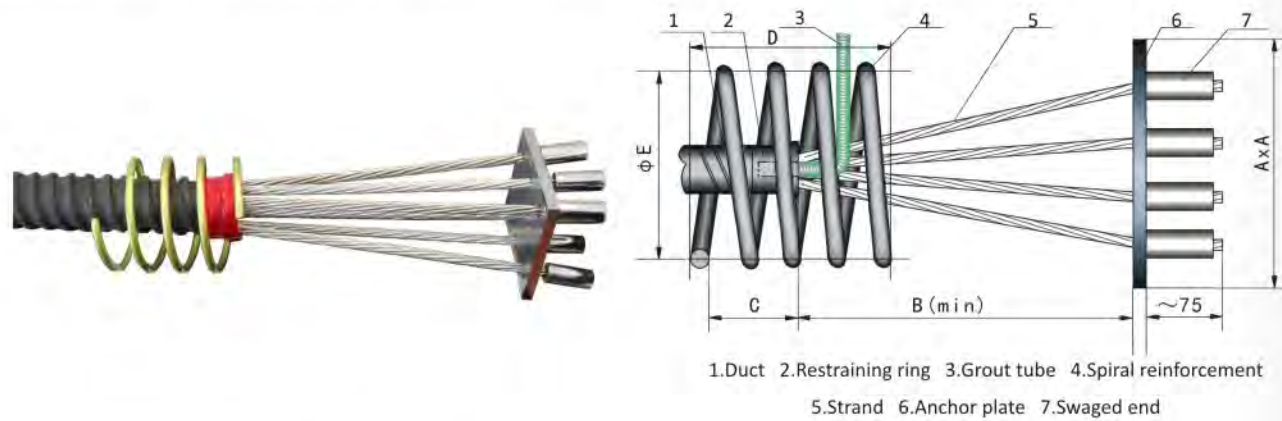
Unit:mm

Designation	D	d	L
OLG-50	φ 75	φ 60	More than 250mm or as per request
OLG-60	φ 86	φ 70	
OLG-70	φ 97	φ 80	
OLG-80	φ 106	φ 90	
OLG-85	φ 112	φ 95	
OLG-90	φ 122	φ 100	
OLG-100	φ 132	φ 110	
OLG-120	φ 154	φ 130	
OLG-130	φ 164	φ 140	

Designation	D	d	d ₁	D ₁	L
OLT-(2~3)	φ 64	φ 67	φ 52	φ 56	130
OLT-(4~5)	φ 64	φ 68	φ 57	φ 61	
OLT-(6~7)	φ 84	φ 88	φ 75	φ 78	
OLT-(8~9)	φ 95	φ 99	φ 85	φ 88	
OLT-(10~12)	φ 100	φ 104	φ 95	φ 98	
OLT-(13~17)	φ 105	φ 109	φ 95	φ 98	
OLT-(18~19)	φ 115	φ 119	φ 105	φ 108	
OLT-(20~27)	φ 135	φ 139	φ 124	φ 128	145
OLT-(28~31)	φ 145	φ 149	φ 134	φ 138	

Dead-end Anchorage Type P OVM.P15/P13

Type P anchorage is composed of the swaged end, anchor plate, spiral reinforcement restraining ring. The swaged end is formed by using Swaging Machine to impose plastic deformation on swage socket internally lined with swage spring to firmly grip around strand. Strands in tendon being fixed with swaged ends are dispersed by anchor plate and are normally placed at girder end. Tension load directly transfers to concrete through bonding and anchor plate.



GYJC50-150 Swaging Machine

Swage Socket and Swage Spring



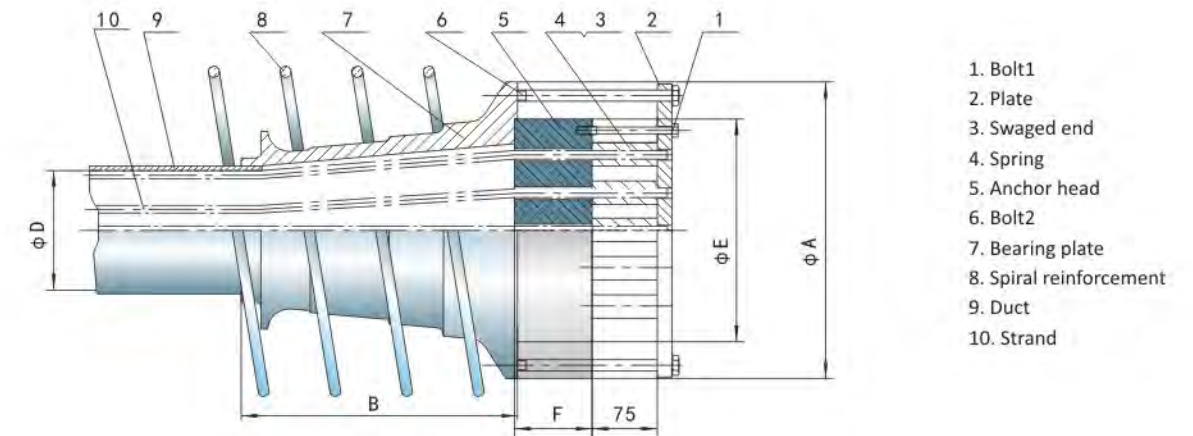
Main Data

Unit:mm

Strand number	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18~19	20~22	23~27	28~31	32~34	35~37
AxA	100x80 (90x70)	120 (100)	140 (120)	155 (140)	170 (150)	185 (170)	195 (170)	210 (220)	220 (220)	230 (220)	240 (250)	250 (250)	260 (250)	260 (250)	285 (250)	300 (250)	300 (250)	325	350	380	400	420
B (min)	180 (120)	180 (120)	240 (180)	300 (180)	380 (300)	380 (380)	440 (380)	440 (440)	500 (440)	500 (440)	500 (440)	500 (500)	560 (500)	560 (500)	720 (500)	720 (500)	900	1000	1100	1100	1200	
C	110 (85)	110 (85)	110 (110)	110 (110)	120 (110)	120 (110)	120 (110)	120 (120)	135 (120)	135 (120)	135 (120)	135 (135)	135 (135)	135 (135)	135 (135)	135 (135)	135	135	135	135	135	
D	160 (200)	200 (200)	200 (200)	200 (200)	200 (200)	200 (200)	200 (200)	200 (250)	250 (250)	250 (250)	250 (250)	275 (250)	330 (250)	330 (250)	360 (250)	360 (250)	360	360	420	480	480	
φ E	115 (110)	130 (120)	150 (135)	170 (145)	200 (165)	200 (165)	216 (175)	240 (190)	270 (216)	270 (216)	270 (216)	270 (230)	285 (230)	300 (240)	300 (240)	300 (240)	310 (265)	320	350	390	465	465

The figures in brackets are for OVM.P13.

Dead-end Anchorage Type PT OVM.M15A-nPT



Main Data

Type	Bearing plate	Duct	Anchor head	
	ΦAxB	ΦD	ΦE	F
OVM.M15A-3PT	Φ136x80	50	91	35
OVM.M15A-4PT	Φ140x125	55	102	35
OVM.M15A-5PT	Φ155x130	55	115	40
OVM.M15A-6PT	Φ165x160	70	126	45
OVM.M15A-7PT	Φ172x170	70	126	45
OVM.M15A-8PT	Φ185x180	80	136	45
OVM.M15A-9PT	Φ200x190	80	146	50
OVM.M15A-10PT	Φ210x210	90	156	50
OVM.M15A-11PT	Φ210x220	90	166	50
OVM.M15A-12PT	Φ214x230	90	166	55
OVM.M15A-13PT	Φ224x230	90	170	55
OVM.M15A-14PT	Φ233x260	90	176	60
OVM.M15A-15PT	Φ246x290	90	186	60
OVM.M15A-16PT	Φ246x330	90	196	60
OVM.M15A-17PT	Φ258x395	90	196	60
OVM.M15A-18/19PT	Φ272x325	100	206	60
OVM.M15A-(20~22)PT	Φ300x325	120	226	60
OVM.M15A-23/24PT	Φ330x430	120	244	70
OVM.M15A-25/26PT	Φ330x430	120	244	75
OVM.M15A-27PT	Φ330x430	120	244	80

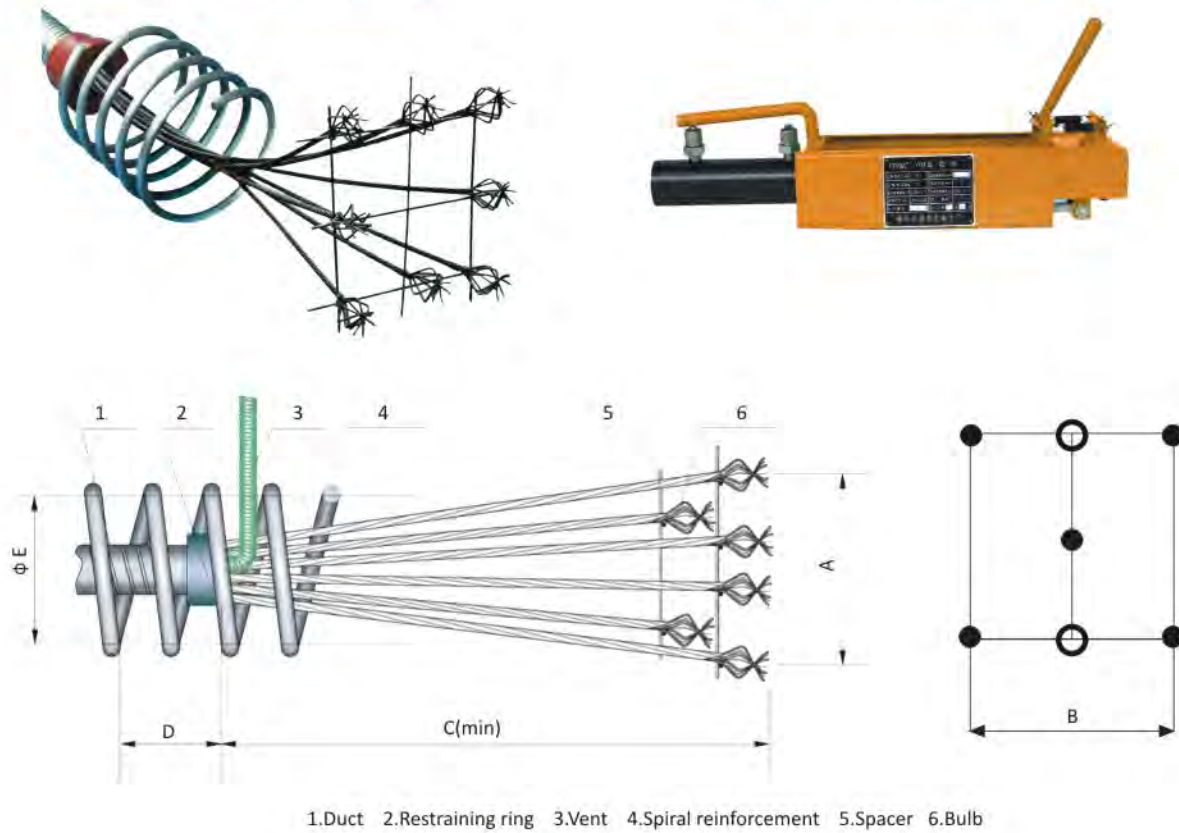
The data of spiral reinforcement is same with OVM.M15A

Dead-end Anchorage Type H OVM.H15/H13

Type H anchorage is the most convenient fixed-end solution for on site operation. The prestressing force is transferred to the concrete partially by bond and partially by bulb formed by YH3 bulb machine.

Dead-end Anchorage

YH3 Bulb Machine



1.Duct 2.Restricting ring 3.Vent 4.Spiral reinforcement 5.Spacer 6.Bulb

Main Data

Unit:mm

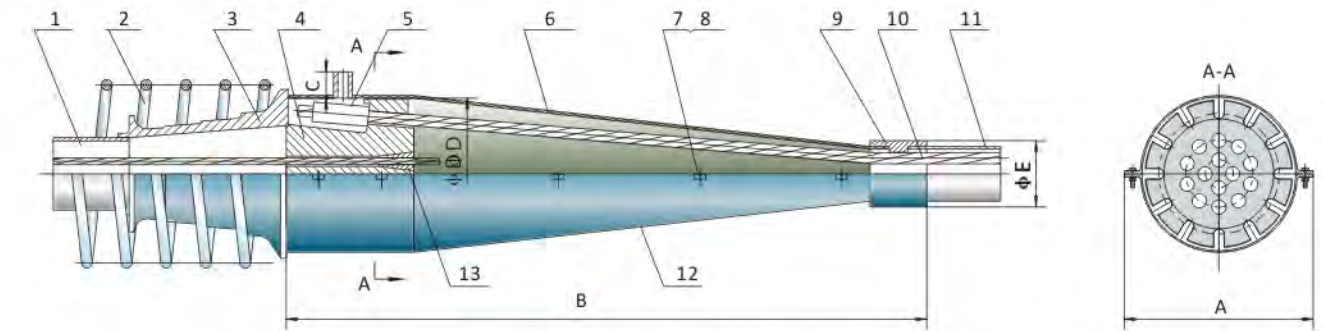
Designation	Qty of strand	A	B	C(min)	D	φ E
OVM.H ₁₃ ¹⁵ -3	3	190(130)	90(70)	950(650)	145(145)	130(120)
OVM.H ₁₃ ¹⁵ -4	4	190(150)	210(170)	950(650)	145(145)	150(135)
OVM.H ₁₃ ¹⁵ -5	5	200(160)	220(180)	950(650)	145(145)	170(145)
OVM.H ₁₃ ¹⁵ -6/7	6/7	210(170)	230(190)	1300(850)	155(155)	200(165)
OVM.H ₁₃ ¹⁵ -9	9	270(220)	310(250)	1300(850)	155(155)	240(190)
OVM.H ₁₃ ¹⁵ -12	12	330(270)	390(310)	1300(850)	155(155)	270(216)
OVM.H ₁₃ ¹⁵ -19	19	390(310)	470(390)	1300(950)	155(155)	310(265)
OVM.H ₁₃ ¹⁵ -27	27	450(410)	520(430)	1700(1150)	155(155)	350(310)
OVM.H ₁₃ ¹⁵ -31	31	510(430)	570(470)	1700(1150)	165(155)	390(315)
OVM.H ₁₃ ¹⁵ -37	37	510(430)	690(570)	2000(1680)	185(165)	465(370)
OVM.H ₁₃ ¹⁵ -43	43	550(560)	750(580)	2500(1680)	210(185)	500(390)
OVM.H ₁₃ ¹⁵ -55	55	620(560)	850(680)	2500(1980)	240(185)	540(465)

The figures in brackets are for OVM.H13.

Coupler OVM.L15/L13

Couplers are used to elongate the tendons which due to tendon length or the construction method used in the project cannot be installed or tensioned in one unit.

Coupler L15/L13 usually includes seven parts: coupler block, bearing plate, protective sleeve, restraining ring, spiral reinforcement, wedge and swaged ends.



1.Duct 2.Spiral reinforcement 3.Bearing plate 4.Coupler block 5.Swaged end 6.Protective cover 7.Bolt 8.Nut 9.Restricting ring 10.Strand 11.Duct 12.Protective cover II 13.Wedge

Main Data of Coupler OVM.L15

Unit:mm

Designation	A	B	C	φ D	φ E
L15-2	190	643	40	147	80
L15-3	195	643	40	152	80
L15-4	207	669	40	164	85
L15-5	219	708	40	176	85
L15-(6~7)	233	708	40	190	100
L15-8	240	708	40	197	110
L15-9	251	757	40	208	110
L15-10	260	757	40	217	120
L15-(11~12)	273	809	40	230	120
L15-13	274	824	40	231	120
L15-14	283	865	40	240	120
L15-15	295	921	40	252	120
L15-(16~17)	300	947	40	257	120
L15-(18~19)	311	955	40	268	140
L15-(20~22)	331	960	40	288	180
L15-(23~27)	359	1087	40	316	180
L15-(28~31)	409	1268	40	366	180

Main Data of Coupler OVM.L13

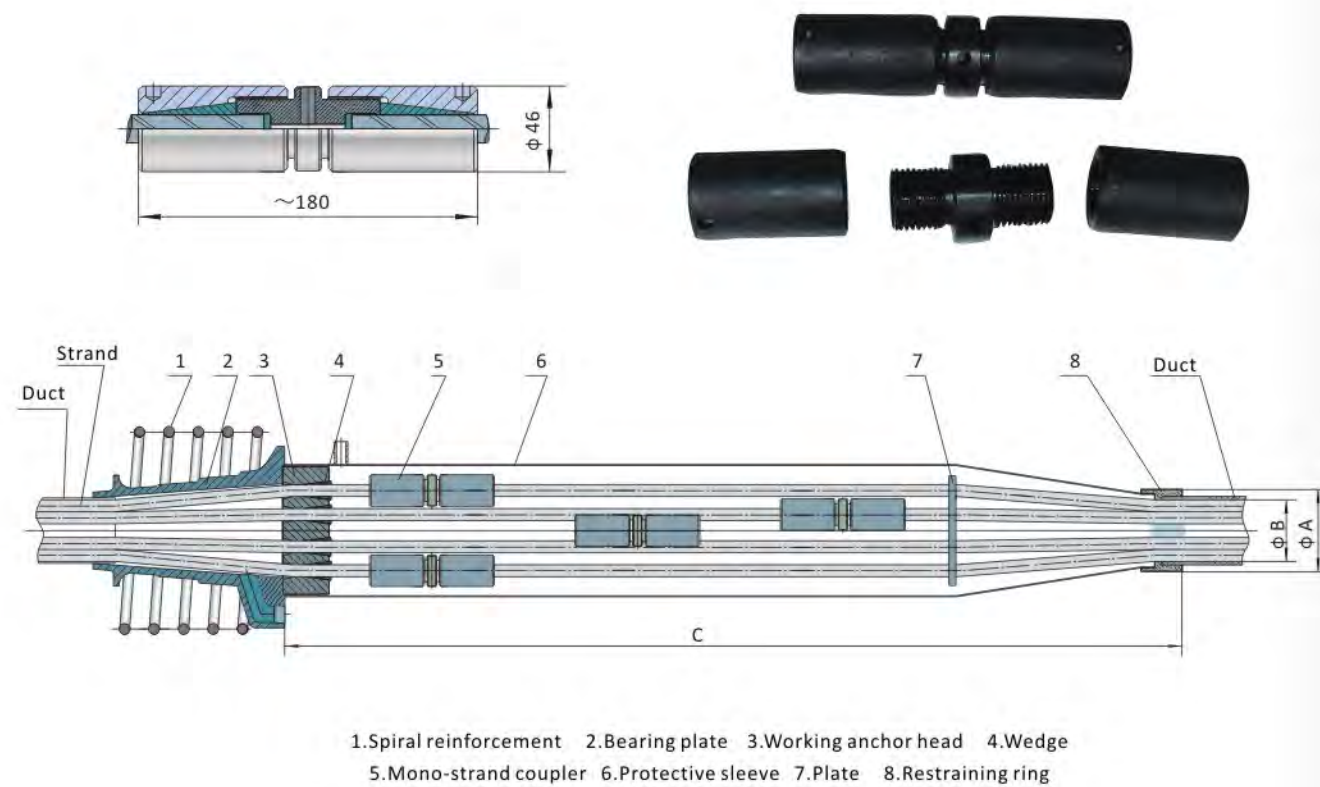
Unit:mm

Designation	A	B	C	φ D	φ E
L13-2	179	594	40	136	75
L13-3	184	616	40	141	75
L13-4	189	616	40	146	80
L13-5	204	682	40	161	80
L13-(6~7)	222	719	40	179	90
L13-8	222	719	40	179	90
L13-9	230	719	40	187	100
L13-(10~11)	240	719	40	197	110
L13-(12~13)	254	774	40	211	100
L13-14	260	800	40	217	110
L13-15	270	803	40	227	120
L13-(16~19)	280	852	40	237	120
L13-(20~22)	315	1010	40	272	120
L13-(23~27)	366	1195	40	323	130
L13-(28~31)	407	1358	40	364	140

Coupler PD

This coupler is used to connect and elongate single strand. It is composed of n (n-strand number) pieces of mono-couplers which are set parallelly in the protective sleeve, usually including seven parts : anchor head, bearing plate, spiral reinforcement, protective sleeve, restraining ring, wedge and mono-coupler.

Coupler Type PD



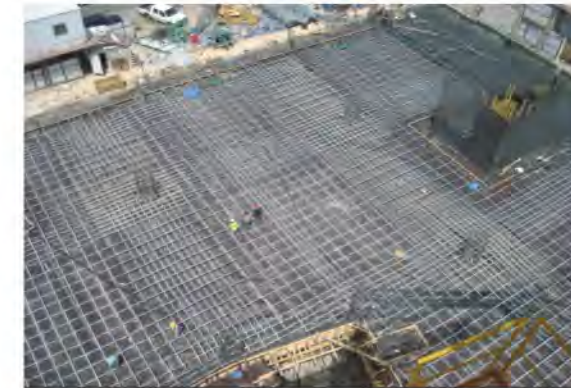
Main Data

Unit:mm

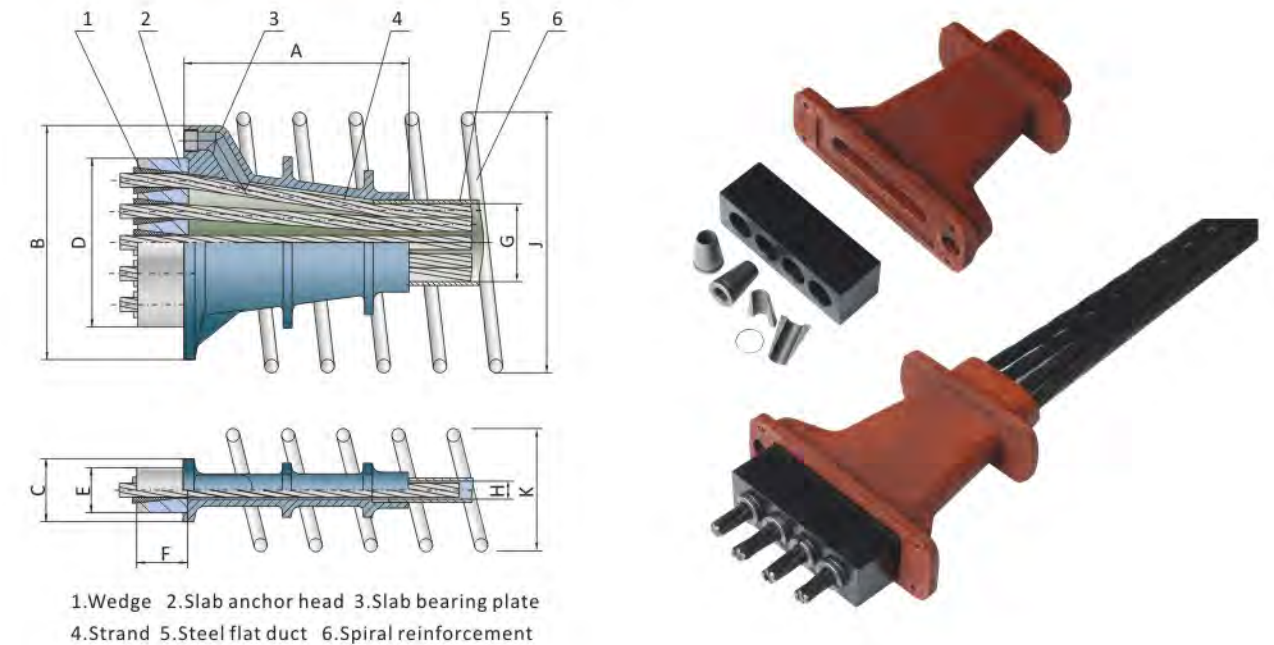
Spec. Size	OVM ¹⁵ ₁₃ L-F-3	OVM ¹⁵ ₁₃ L-F-4	OVM ¹⁵ ₁₃ L-F-5	OVM ¹⁵ ₁₃ L-F-6	OVM ¹⁵ ₁₃ L-F-7	OVM ¹⁵ ₁₃ L-F-8	OVM ¹⁵ ₁₃ L-F-9	OVM ¹⁵ ₁₃ L-F-12	OVM ¹⁵ ₁₃ L-F-19	OVM ¹⁵ ₁₃ L-F-27	OVM ¹⁵ ₁₃ L-F-31	OVM ¹⁵ ₁₃ L-F-37
	φ A	80 (75)	85 (80)	85 (80)	100 (90)	100 (90)	110 (90)	110 (100)	120 (110)	140 (120)	180 (140)	180 (145)
B	58 (53)	63 (58)	63 (58)	80 (68)	80 (68)	90 (68)	90 (80)	100 (90)	110 (100)	130 (110)	140 (115)	150 (130)
C	840 (830)	1080 (1060)	1090 (1080)	810 (790)	1130 (1090)	1450 (1420)	1150 (1130)	1200 (1180)	1310 (1250)	1420 (1360)	1410 (1400)	1560 (1430)

The figures in brackets are for OVM.13L-F.

Stressing-end Slab Anchorage OVM.BM13/15



Stressing-end Slab Anchorage

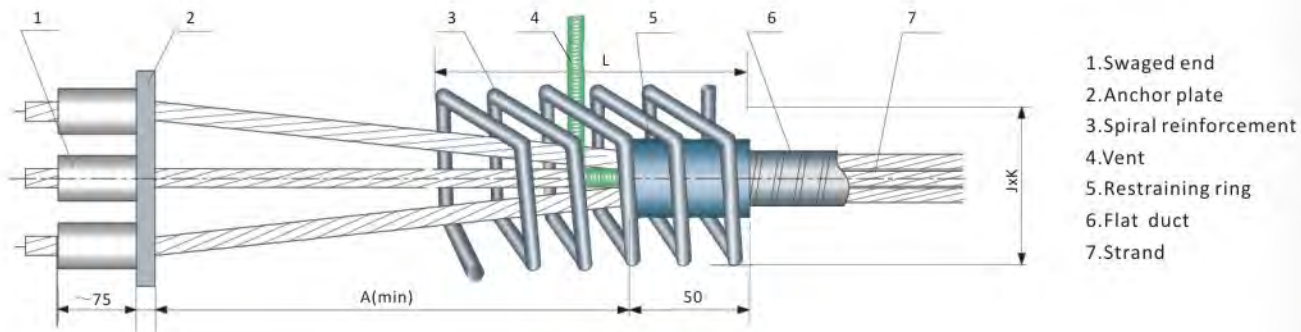


Main Data

Unit:mm

Designation	Bearing plate			Anchor head			Duct		Spiral reinforcement
	A	B	C	D	E	F	G	H	J x K
OVM.BM13/15-2	120	150	70	80	48	50	50	19	130 x 100
OVM.BM13/15-3	150	180	70	115	48	50	60	19	170 x 100
OVM.BM13/15-4	210	220	70	150	48	50	70	19	210 x 100
OVM.BM13/15-5	250	260	70	185	48	50	90	19	250 x 100

Dead-end Slab Anchorage Type BP

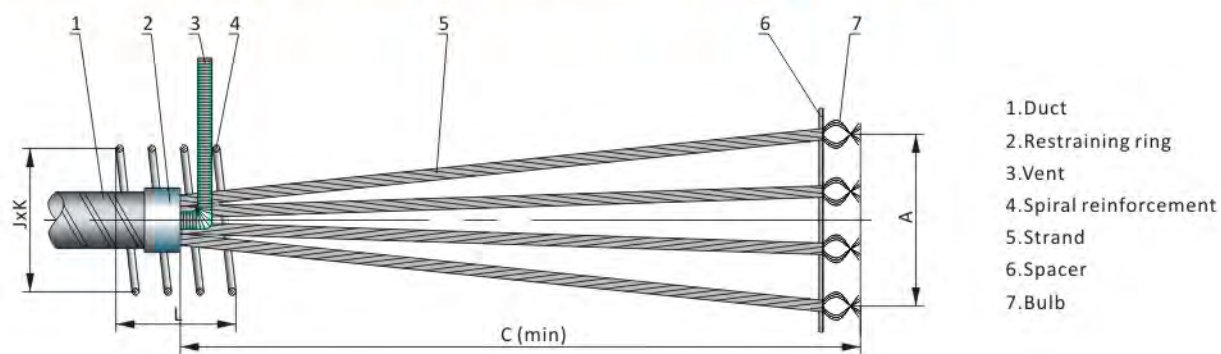


Main Data

Unit:mm

Designation	Anchor plate		Spiral reinforcement L×J×K	Restraining ring		Flat duct		A Min
	Length	Width		Length	Width	Length	Width	
OVM.BH13/15-2	140	70	180 × 130 × 100	68	40	50	19	190
OVM.BH13/15-3	180	70	180 × 170 × 100	78	40	60	19	250
OVM.BH13/15-4	220	70	180 × 210 × 100	88	40	70	19	320
OVM.BH13/15-5	260	70	225 × 250 × 100	108	40	90	19	400

Dead-end Slab Anchorage Type BH

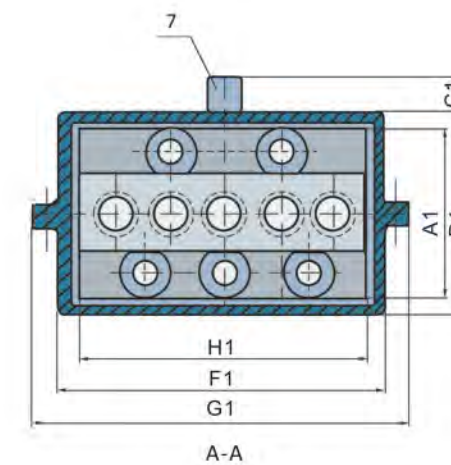
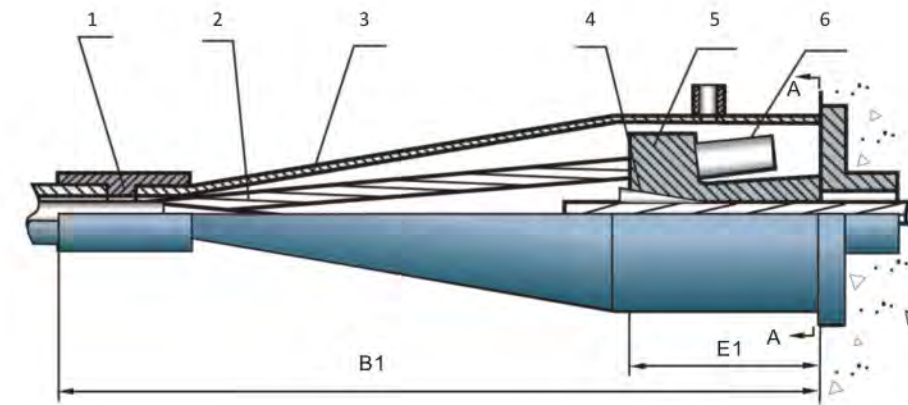


Main Data

Unit:mm

Strand number	A	C(min)	Spiral reinforcement L×J×K	Restraining ring	
				Length	Width
2	90	950	180 × 130 × 100	68	40
3	190	950	180 × 170 × 100	78	40
4	240	950	180 × 210 × 100	88	40
5	270	950	225 × 250 × 100	108	40

Coupler of Slab Anchorage Type BL



Main Data

Unit:mm

Designation	A1	B1	C1	D1	E1	F1	G1	H1
OVM.BL13/15-2	100	700	25	118	135	90	130	80
OVM.BL13/15-3	100	700	25	118	135	125	165	115
OVM.BL13/15-4	100	750	25	118	135	160	200	150
OVM.BL13/15-5	100	750	25	118	135	195	235	185

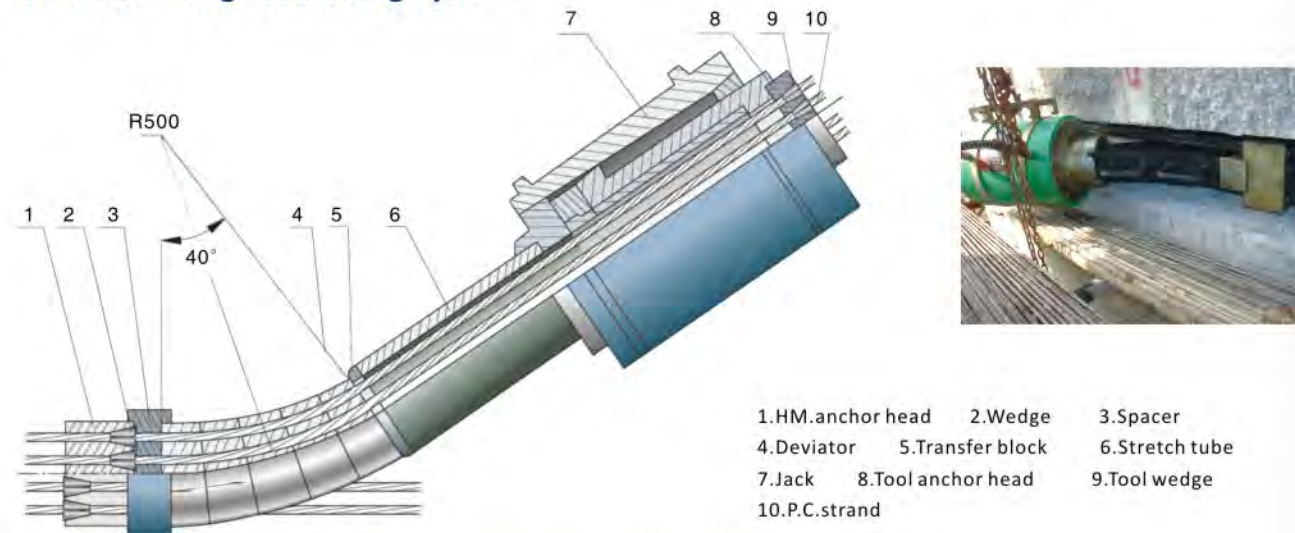
Ring Anchoring System OVM.HM

Application Circumstance

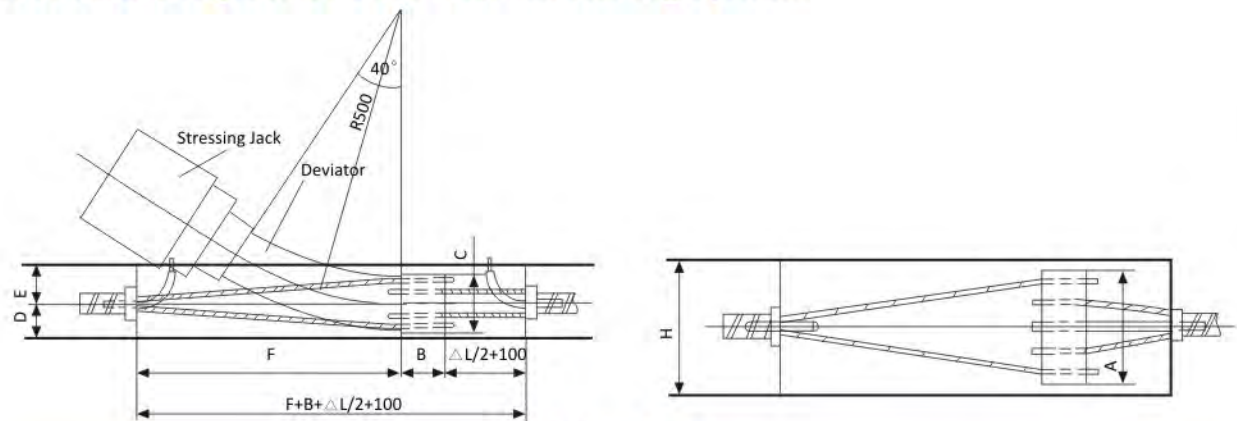
- Round PC storage tank, such as silo, liquid gas tank and sewage treatment tank
- PC containment of nuclear reactor
- PC Hydrodynamic tunnel and well
- Other similar round prestressed concrete structure

OVM.HM anchoring system is used to exert prestressing force to ring structure. Both stressing end and dead end of ring prestressing tendon are integrally combined at anchor head (serving as a coupler). A special deviating device is required for tensioning tendons.

OVM.HM Ring Anchoring System



Structural Diagram of OVM.HM Anchoring System



Main Data

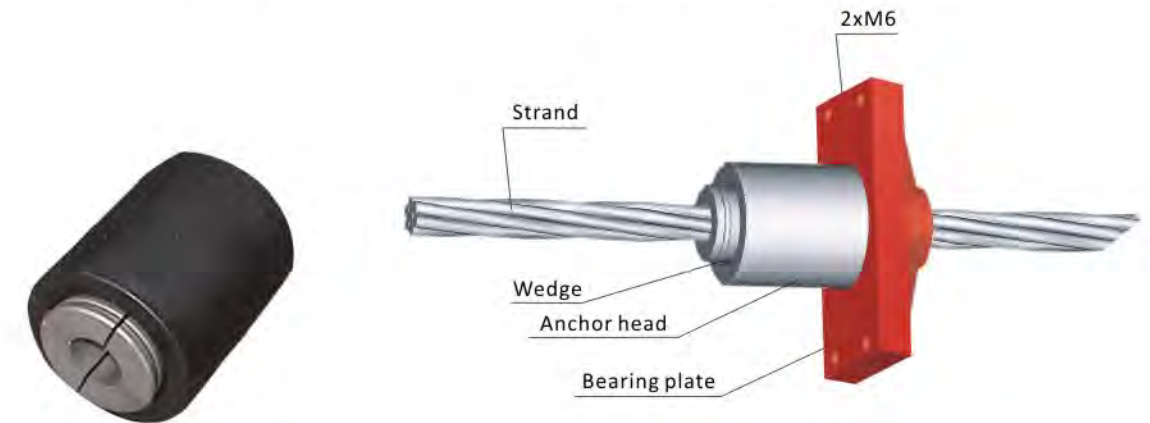
Unit:mm

Designation	A	B	C	D	F	H
OVM.HM15-2	160	48	60	45	700	200
OVM.HM15-4	196	80	90	65	800	240
OVM.HM15-6	210	90	130	85	800	250
OVM.HM15-8	230	100	148	100	800	270
OVM.HM15-12	290	100	160	110	800	320
OVM.HM15-14	320	120	180	110	1000	340

1.Parameter E would be determined according to actual engineering structure.

Mono- strand Post-tensioning Systems

OVM Mono-strand Anchorage are applicable for strand Diameter 12.7/12.9/15.24/15.7/17.8/21.8/28.6mm.



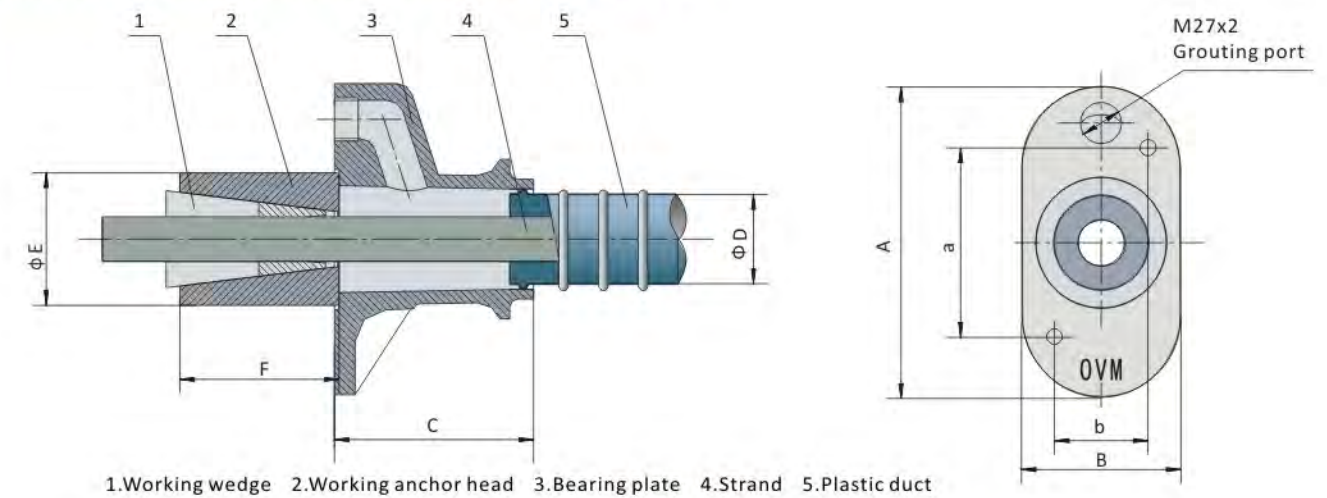
Assembly of Mono-strand Anchorage

Main Data

Unit:mm

Designation	Bearing plate	Anchor head	Spiral reinforcement				Stressing jack
	AxBxC	φ ExF	φ G	φ H	I	N	
OVM.M15A-1	80x80x14	φ 50 x 48	φ 80	φ 6	30	4	YDC240QX
OVM.M13A-1	80x80x14	φ 40 x 40	φ 80	φ 6	30	3	YDC240QX

Mono-strand Anchorage OVM.M22/M28



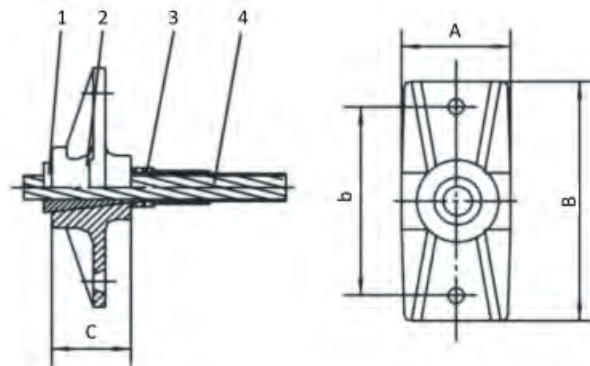
Main Data

Unit:mm

Designation	Bearing plate		Duct	Anchor head
	AxBxC	Installation distance a x b	(I.D)	φ ExF
OVM.M22-1	145x90x100	80x58	φ 30	φ 65x75
OVM.M28-1	195x100x125	120x60	φ 40	φ 85x100

Jack YC75Q is used for stressing OVM.M28-1 and OVM.M22-1. Hydraulic Pump - ZB4-500 serves the operation.

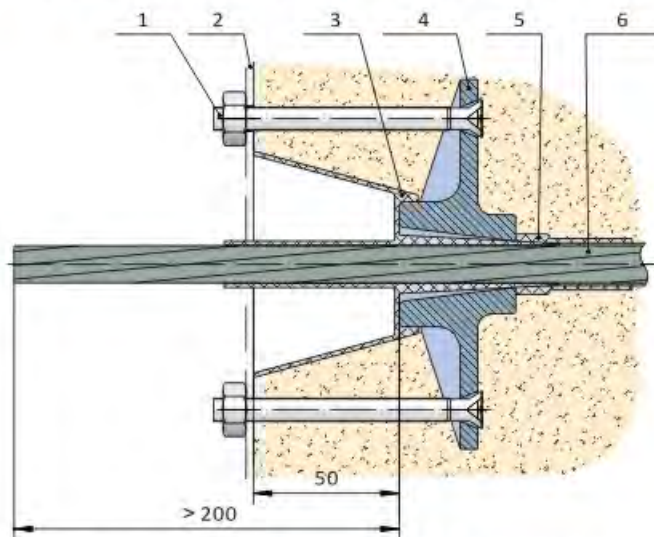
Mono Unbonded Strand Anchorage OVM.DZ13A/DZ15A



1.Working wedge 2.Anchorage Body
3.Sealing sleeve 4.Unbonded strand

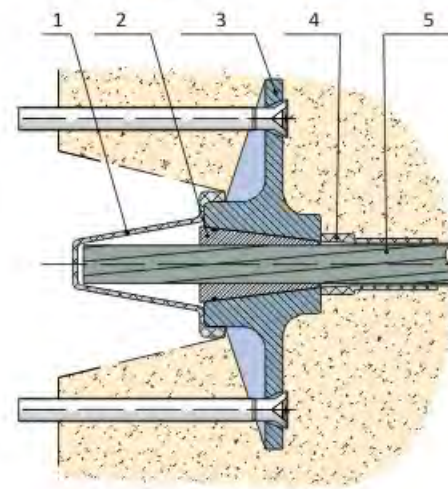
Designation	Bearing plate	
	AxBxC	Installation distance b
OVM.DZ13A-1	58x127x40	100
OVM.DZ15A-1	65x130x48	100

Installation drawing of rabbit shuttering

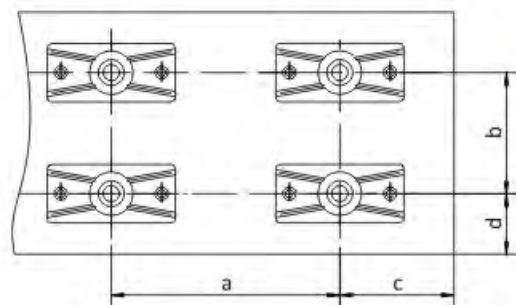


1.Bolt 2.Shuttering 3.Connecting sleeve 4.Anchorage Body
5.Sealing sleeve 6.Unbonded steel strand

Drawing of sealing anchorage



1.Protective cover 2.Wedge 3.Anchorage Body
4.Sealing sleeve 5.Unbonded steel strand

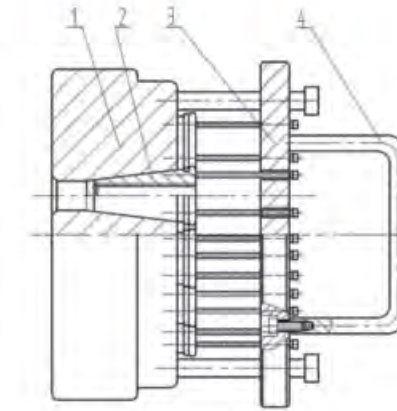


Designation	Actual concrete strength (Cube Sample)							
	30 (MPa)				40 (MPa)			
	a	b	c	d	a	b	c	d
OVM.DZ13A-1	135	90	90	54	130	60	90	54
OVM.DZ15A-1	185	120	95	60	145	100	90	54

Tool Anchorage OVM15G/13G



Auto-tool anchorage



1.Anchor head 2.Tool wedge
3.Holding plate 4. Handle



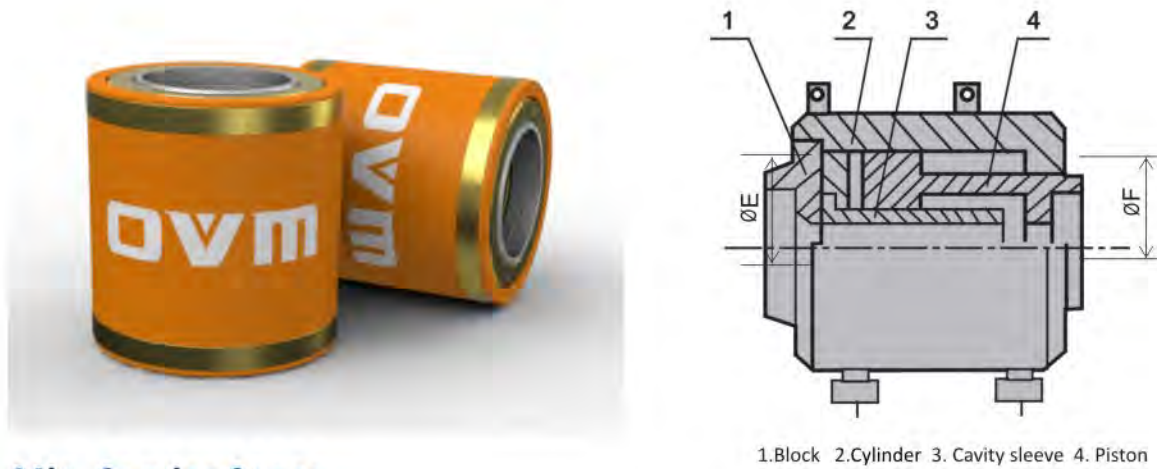
Hand-tool anchorage

Main Data

Designation	Dimension of tool anchor head D*L (mm)	No. of tool wedge	Holding plate	Handle
OVM15G-1	φ 49*55	1	N	N
OVM15G-2	φ 134*60	2	N	N
OVM15G-3	φ 134*60	3	N	N
OVM15G-4	φ 134*60	4	N	N
OVM15G-5	φ 134*60	5	N	N
OVM15G-6	φ 175*60	6	N	N
OVM15G-7	φ 175*60	7	Y/N	Y/N
OVM15G-8	φ 175*60	8	Y	Y
OVM15G-9	φ 175*60	9	Y	Y
OVM15G-10	φ 184*70	10	Y	Y
OVM15G-11	φ 184*70	11	Y	Y
OVM15G-12	φ 184*70	12	Y	Y
OVM15G-13	φ 194*70	13	Y	Y
OVM15G-14	φ 194*70	14	Y	Y
OVM15G-15	φ 250*80	15	Y	Y
OVM15G-16	φ 250*90	16	Y	Y
OVM15G-17	φ 250*90	17	Y	Y
OVM15G-18	φ 250*90	18	Y	Y
OVM15G-19	φ 250*90	19	Y	Y
OVM15G-21	φ 300*120	21	Y	Y
OVM15G-22	φ 300*120	22	Y	Y
OVM15G-25	φ 300*120	25	Y	Y
OVM15G-27	φ 300*120	27	Y	Y
OVM15G-31	φ 300*120	31	Y	Y
OVM15G-34	φ 370*140	34	Y	Y
OVM15G-37	φ 370*140	37	Y	Y

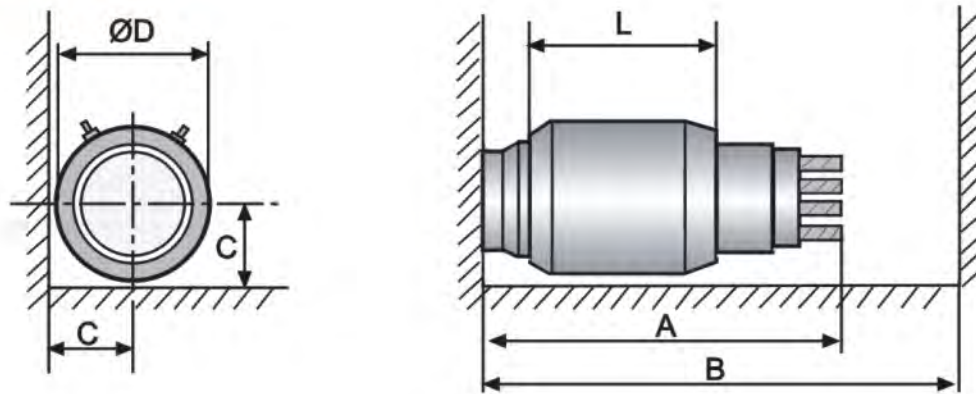
Designation	Dimension of tool anchor head D*L (mm)	No. of tool wedge	Holding plate	Handle
OVM13G-1	φ 43*47	1	N	N
OVM13G-3	φ 134*60	3	N	N
OVM13G-4	φ 134*60	4	N	N
OVM13G-5	φ 134*60	5	N	N
OVM13G-6	φ 134*60	6	N	N
OVM13G-7	φ 134*60	7	Y/N	Y/N
OVM13G-8	φ 134*60	8	Y	Y
OVM13G-9	φ 175*60	9	Y	Y
OVM13G-12	φ 175*60	12	Y	Y
OVM13G-13	φ 175*60	13	Y	Y
OVM13G-15	φ 184*70	15	Y	Y
OVM13G-16	φ 184*70	16	Y	Y
OVM13G-17	φ 184*70	17	Y	Y
OVM13G-19	φ 184*70	19	Y	Y
OVM13G-21	φ 250*70	21	Y	Y
OVM13G-22	φ 250*70	22	Y	Y
OVM13G-27	φ 250*70	27	Y	Y
OVM13G-31	φ 300*120	31	Y	Y
OVM13G-43	φ 300*110	43	Y	Y

Hydraulic Jack YCWA /B Series



1. Block 2. Cylinder 3. Cavity sleeve 4. Piston

Min. Service Space

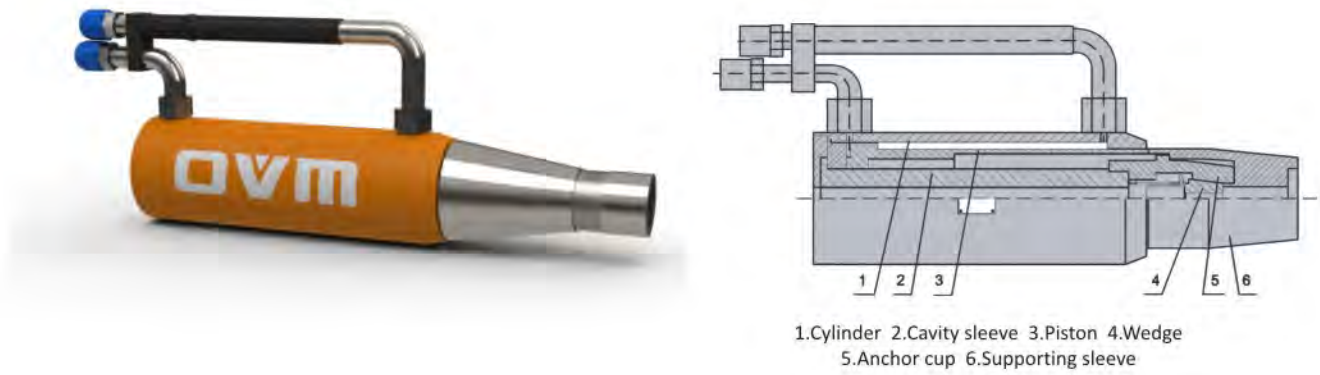


Main Data

Type	Nom. force (kN)	Nom. pressure (MPa)	Tension piston area (m ²)	Return piston area (m ²)	Return pressure (MPa)	Cavity aperture (mm)	Stroke (mm)	Mass (Kg)	Overall size (DxL mm)	Min. service space (mm) BxC	Strand reserved length A (mm)	Installation size	
												φ E	φ F
YCW650A	6500	49	1.35x10 ¹	7.07x10 ²	<20	φ 240	200	960	φ 610x640	2000x330	850	φ 362	φ 302
YCW900A	8820	54	1.658x10 ¹	8.276x10 ²	<25	φ 280	200	1235	φ 670x600	2200x450	1000	φ 392	φ 372
YCW1200A	11790	51	2.313x10 ¹	11.538x10 ²	<25	φ 275	200	1700	φ 790x600	2400x500	1200	φ 421	φ 421
YCW100B	973	51	1.908x10 ⁻²	0.777x10 ⁻²	<25	φ 78	200	65	φ 214x370	1220x150	570	φ 151	φ 136
YCW150B	1492	50	2.98x10 ⁻²	1.38x10 ⁻²	<25	φ 120	200	108	φ 285x370	1250x190	570	φ 196	φ 176
YCW250B	2480	54	4.592x10 ⁻²	2.802x10 ⁻²	<25	φ 140	200	164	φ 344x380	1270x220	590	φ 210	φ 186
YCW350B	3497	54	6.476x10 ⁻²	3.462x10 ⁻²	<25	φ 175	200	246	φ 410x404	1320x250	620	φ 252	φ 252
YCW400B	3956	52	7.607x10 ⁻²	4.592x10 ⁻²	<25	φ 175	200	270	φ 432x400	1320x265	620	φ 252	φ 252
YCW500B	4924	49	10.05x10 ⁻²	4.773x10 ⁻²	<25	φ 196	200	533	φ 490x564	1960x310	750	φ 362	φ 302

1.A: YCW series hydraulic jack are widely applied to pre-tensioning and post-tensioning operations. When equipped with different accessories, it is able to tension with OVM multi-strand anchorage, DM heading anchorage and stay cable anchorage etc.

Mono-jack YDC240QX

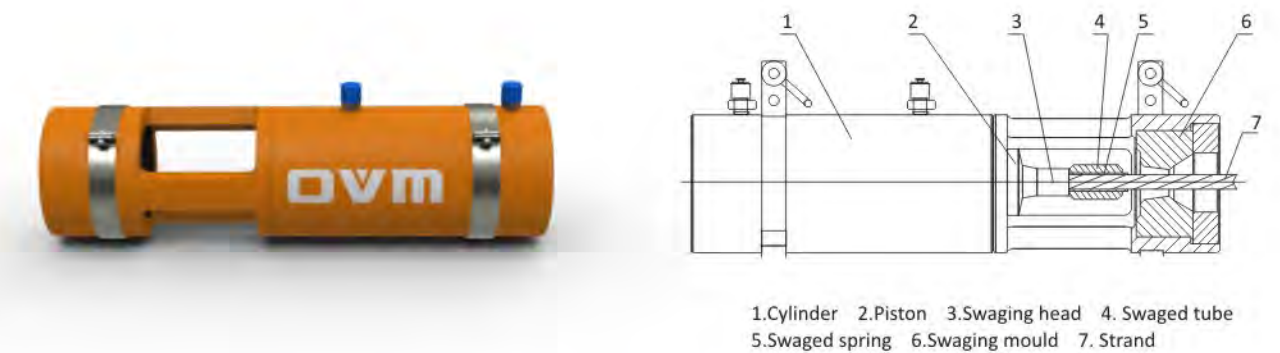


1. Cylinder 2. Cavity sleeve 3. Piston 4. Wedge 5. Anchor cup 6. Supporting sleeve

Main Data

Type	Nom. force (kN)	Nom. pressure (MPa)	Tension piston area (m ²)	Return pressure (MPa)	Cavity aperture (mm)	Stroke (mm)	Mass (Kg)	Dimension DxL (mm)	Adapted strands
YDC240QX	240	50	4.771x10 ⁻³	<40	φ 17	200	20.5	φ 210x568	φ 13 & φ 15

Swaging Machine GYJC50-150

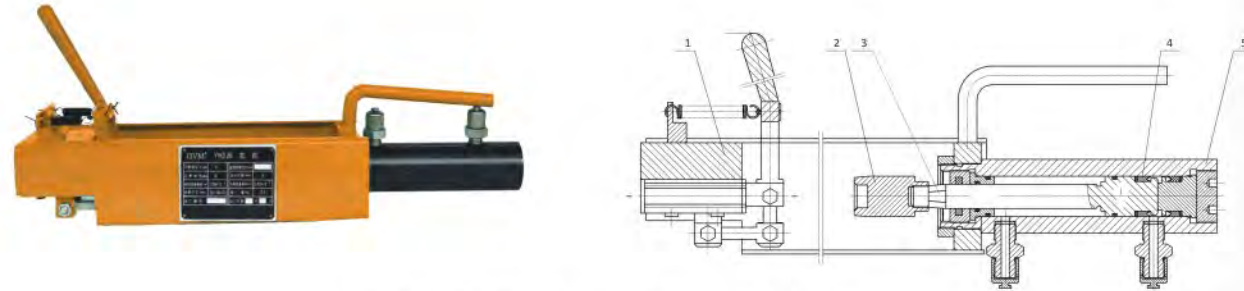


1. Cylinder 2. Piston 3. Swaging head 4. Swaged tube 5. Swaged spring 6. Swaging mould 7. Strand

Main Data

Type	Nom. force (kN)	Nom. pressure (MPa)	Swaging piston area (m ²)	Return piston area (m ²)	Cavity aperture (mm)	Stroke (mm)	Mass (Kg)	Dimension DxL (mm)	Adapted pump
GYJC50-150	503	50	1.005x10 ⁻²	4.9485x10 ⁻³	φ 30	150	48	φ 150x565	ZB4-500

Bulb Machine YH3



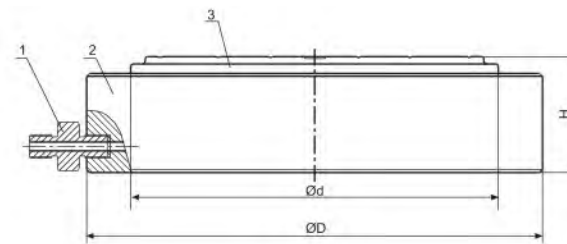
1.Jack 2.Pushing head 3.Piston 4.Cylinder

Main Data

Type	Nom. Force (kN)	Nom. Pressure (MPa)	Tension piston area (m ²)	Return piston area (m ²)	Mass (Kg)	Dimension LxWxH (mm)	Diameter of bulb (Φ15mm strand) (mm)
YH3	34	50	7.068x10 ⁻⁴	4.524x10 ⁻⁴	13.6	535x150x224	Φ90±5

Flat Jack YBD Series

The compact design of YBD series flat jack perfectly fit operations at narrow space, especially for the replacement of bridge bearings and jacking of heavy structures.



1. Nozzle 2. Cylinder 3. Piston

Main Data

Type	Nom. force (kN)	Nom. pressure(MPa)	Stroke (mm)	Dimension (mm)
YDB100-10	1000	50	10	Φ220×50
YDB100A-30	1000	50	30	Φ220×80
YDB250-18	2500	50	18	Φ310×78
YDB350-18	3500	49	18	Φ380×107
YDB400-18	4000	50	18	Φ408×107

Hydraulic Pump ZB4-500/500S/500SZ/500ZA

ZB4-500 Hydraulic Pump



ZB10/320-4/800B Hydraulic Pump



Main Data

Type	Nom. pressure (MPa)	Nom. flow (L/min.)	Mass (Kg)	Dimension LxWxH (mm)	Remarks
ZB4-500	50	2x2	120	745x494x1052	To provide pressure oil for YCW, YZ85 and YC60 series jacks, as well as GYJC swaging machine etc.
ZB4-500S	50	2x2	130	745x494x1052	Three-way oil feeding, especially for jacks with pressing piston. It can also fulfill the function of ZB4-500 pump.
ZB10/320-4/800B	32	10	270	1090x590x1120	Two stage variable pump, for large tonnage, long stroke and rapid jacks.
	80	4			
ZB4-500ZA	50	2x2	120	1020x530x950	Modified ZB4-500
ZB4-500SZ	50	2x2	130	1020x530x950	Modified ZB4-500S

Modified ZB4-500—ZB4-500ZA



Modified ZB4-500S—ZB4-500SZ



Hydraulic Pump YBJD2-63 / YBJD4-63



YBJD2-63 Main Data

Nom. pressure (Mpa)	63		Nom.flow (L/min)	1.8
Capacity of oil tank (L)	47		Motor power (KW)	5.5
Liter (L)	30		Power	380VAC/50HZ
Mass (Kg)	Empty	Full	Dimension (mm)	810x430x855
	160	202		
Hydraulic oil (used)	L-HM46# (summer) or L-HM 32# (winter) hydraulic oil			

YBJD4-63 Main Data

Nom. pressure (Mpa)	63		Nom.flow (L/min)	3.7
Capacity of oil tank (L)	68		Motor power (KW)	5.5
Liter (L)	41		Power	380VAC/50HZ
Mass (Kg)	Empty	Full	Dimension (mm)	930x470x920
	180	241		
Hydraulic oil (used)	L-HM46# (summer) or L-HM 32# (winter) hydraulic oil			

Grouting Machine

Basic Type

Mortar Pump UB3



Pumping capacity (m ³ /h)	3	
Working pressure (MPa)	2	
Power of electromotor (kw)	4	
Rev of electromotor (r/min)	1440	
When water weight / concrete weight = 0.43	Horizontal delivery capacity (m)	400
	Vertical delivery capacity (m)	90
Inner dia. of mortar Inlet (mm)	64	
Inner dia. of mortar outlet (mm)	38	
Mass (Kg)	250	
Dimension L*W*H (mm)	1033*474*940	

Grout Mixer JW180

Nom. volume (L)	180
Mixing capability (m ³ /h)	6
Power of electromotor (kw)	2.2
Inner dia. of mortar outlet (mm)	64
Mixing speed (r/min)	70
Mass (Kg)	200
Dimension D*H (mm)	φ 900*1146



Advanced Type

Grouting Machine MR-60



Performance	
Max Pumping capacity at 200rpm	53 liters/Min.- at 3 Bar
Max output pressure at 200 rpm	60 Bar
Type of pump	Eccentric screw (Made in Germany)
Suction hose (Dia.)	1" fast coupling

Mixer data	
Drive unit	Electric drive
Electric drive	7.5HP 380V-3-5Hz 8.8A with IP54
Drive speed	1440 rpm
Capacity Dia x Height-Liters with Cover	φ 85 cm x 60 cm -135 liters Max

Agitator data	
Drive unit	Electric drive
Electric drive	7.5HP 380V-3-50Hz 8.8A with IP 54
Drive speed	200 rpm
Capacity Dia x Height-Liters	φ 60 cm x 70 cm -170 liters Max

Water tank data	
Capacity L x W x H - Liters Max	40 cm x 40 cm x 60 cm - 85 liters

Electric data	
Power input	380V-3 phase-50Hz AC 5-Pin 6h, fuse 32A

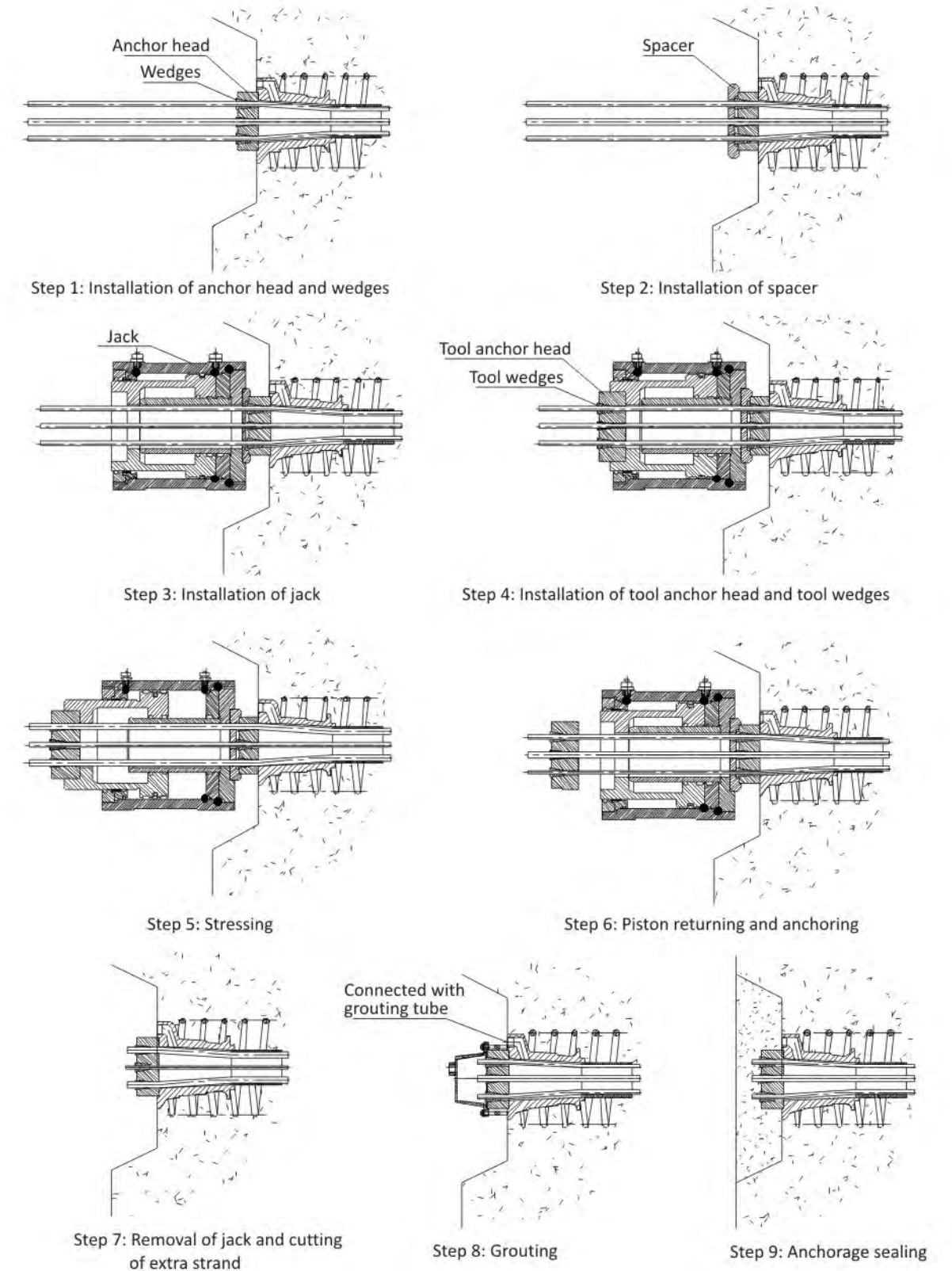
Grouting platform dimension & Mass	
Length x Width x Height	2,150 mm X 1,180 mm X 2,010 mm
Mass	880 Kg

15HP / 30HP Strand Pushing Machine



Horsepower	15HP	30HP
Electric data	380 volts, 3 phases, 50 Hz	
	220 volts, 3 phases, 60 Hz	
Fuse	>100A	>125A
Pushing capacity	80 M/Min	160M/Min
Rotational speed of motor	940 RPM	1450 RPM
Hydraulic pump max pressure	210 Kg/cm ²	210 Kg/cm ²
Overall dimension L*W*H	1220*1280*1000mm	1450*1550*1400mm
Mass	480 Kg	800 Kg

Installation and Stressing



Design Considerations

- Friction losses in anchorage
The friction coefficient is less than 0.025.
- Stress losses due to draw-in of wedge
The draw-in value of OVM anchorage is $\lambda \leq 5\text{mm}$, and $\lambda \leq 6\text{mm}$ is recommended for calculation of the stress
- Friction losses along tendon
Friction losses along the tendon are actually the stress losses due to the friction between tendon and duct, which can be determined with the following formula.



$$\sigma_{12} = \sigma_{con} \left(1 - \frac{1}{e^{kx + \mu\theta}} \right)$$

σ_{12} --- prestress losses caused by friction between tendon and its duct (MPa)

σ_{con} --- Section stress without losses.

X --- Duct distance between stressing-end and calculated section (m)

θ --- Accumulated angle (rad)

μ, k --- friction coefficient, refers to Table 1 and 2.

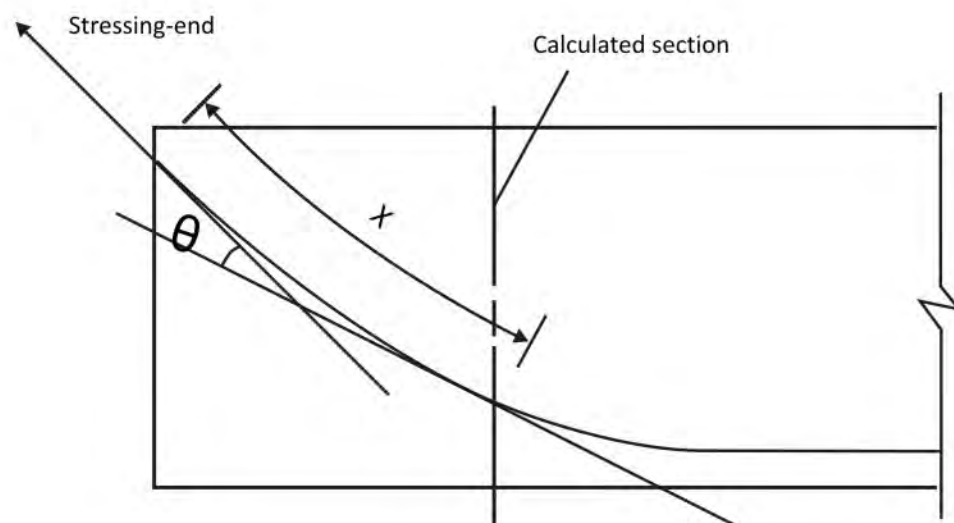


Table1: Coefficient when using strand and duct

Duct mode	K	μ	
		Wire, strand, bare steel bar	Deformed bar
Embedded Steel Pipe	0.003	0.35	0.40
Embedded Corrugated Pipe	0.0015	0.25	-
Core-Pulling Formed	0.0015	0.55	0.60
Plastic Corrugated Pipe	0.001-0.003	0.14	-

When GZ anchorage or Similar anchorages are used, the anchoring port friction loss would be taken into consideration, which can be determined by the actual data measured.

Table 2: Coefficient when using unbonded strand

Unbonded prestressed tendon	K	μ
ϕ 15 Steel strand	0.040	0.12

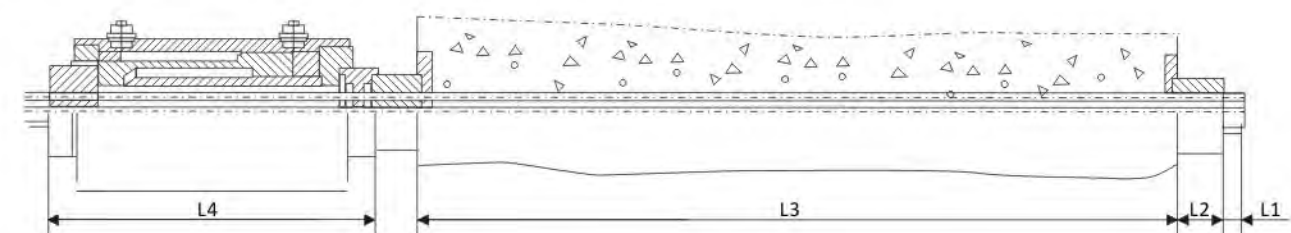
The friction coefficients of strands with other diameters may refer to that of $\phi 15\text{mm}$ strand.

■ Calculation of Strand length

- When using wedge anchorage on both sides and tensioning at one side, shown in diagram as follows, L (length of strand) can be determined with the formula: $L = L1 + 2 * L2 + L3 + L4 + 100 \sim 150\text{mm}$
- When using wedge anchorage on both sides and tensioning at both sides, L (length of strand) can be determined with

the formula:
 $L = L3 + 2 * (L2 + L4) + 200 \sim 300\text{mm}$

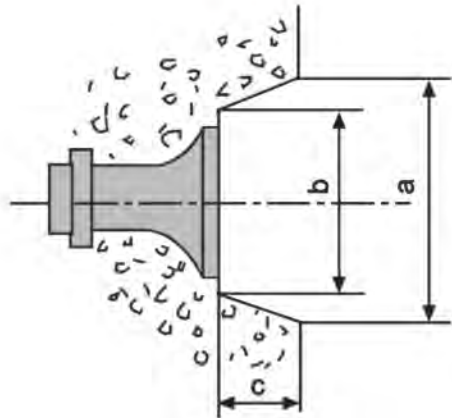
- When using dead-end anchorage type P or type H on one side of tendon, the length of strand shall be considered identically as per the actual embedding position of dead-end anchorage.



Calculation of length of strand (tensioning on one side)

Minimum Interval of Anchorage

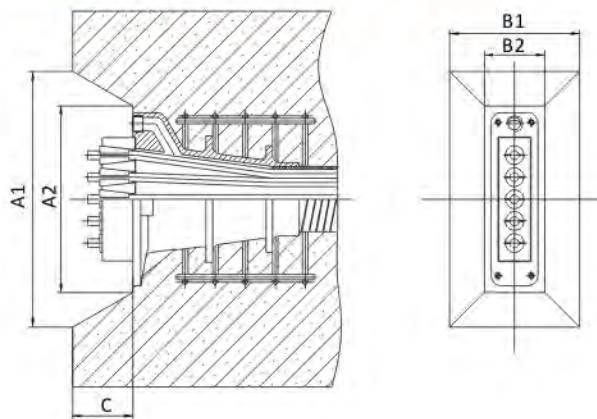
Recess Dimension



Recess Dimension

Designation	a(mm)	b(mm)	c(mm)
OVM.M15(13)-2~4	265(265)	160(160)	90(90)
OVM.M15(13)-5	335(265)	230(160)	90(90)
OVM.M15(13)-6~7	430(275)	290(160)	120(100)
OVM.M15(13)-8~11(8~12)	430(370)	290(220)	120(130)
OVM.M15(13)-12~14	490	340	130
OVM.M15(13)-15~19(13~19)	520(437)	360(275)	140(140)
OVM.M15(13)-20~22	575(500)	400(330)	150(150)
OVM.M15(13)-23~29(23~31)	620(535)	440(340)	150(170)
OVM.M15(13)-30~37(32~37)	710(600)	510(385)	170(190)
OVM.M15(13)-38~44	760(710)	540(470)	190(210)
OVM.M15(13)-45~55	860(775)	620(520)	210(220)

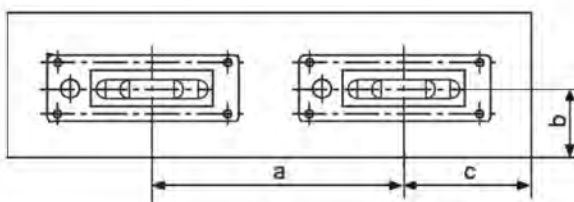
Recess dimension (slab tendon 0°)



Recess dimension (slab tendon 0°)

Designation	A1	A2	B1	B2	C
BM15-2	275	170	195	90	90
BM15-3	305	200	195	90	90
BM15-4	345	240	195	90	90
BM15-5	385	280	195	90	90

Slab Anchorage



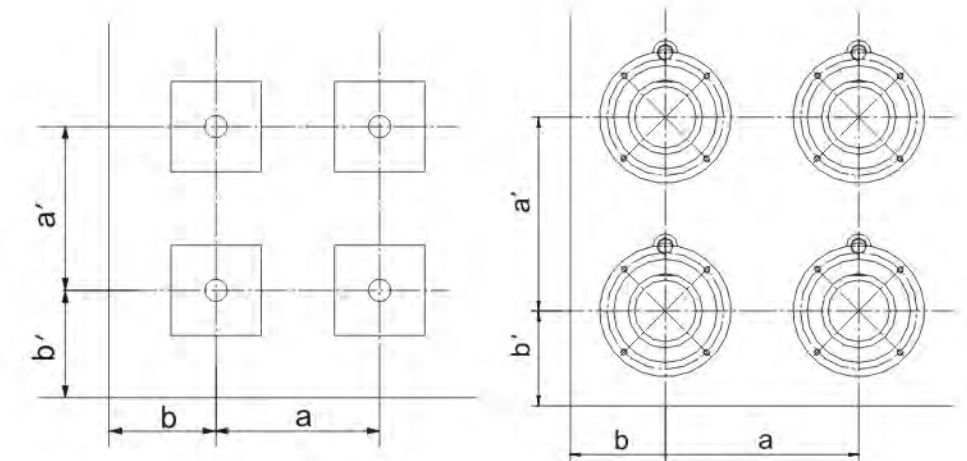
Slab Anchorage

Unit:mm

Designation	Actual Concrete Strength (Cube Sample)					
	40(MPa)			50(MPa)		
	a	b	c	a	b	c
BM15-2	230	75	115	220	70	110
BM15-3	270	80	135	240	75	130
BM15-4	340	95	170	330	90	165
BM15-5	370	95	185	360	90	180

Multi-strand Anchorage

$a, a' \geq a_0$; $b, b' \geq b_0$;
 a_0 —minimum interval between bearing plate
 b_0 —minimum distance between bearing plate center and concrete side.



Spec.	Actual Concrete Strength of Anchored Area(Cube Sample)					
	40(MPa)		50(MPa)		60(MPa)	
	a_0 (mm)	b_0 (mm)	a_0 (mm)	b_0 (mm)	a_0 (mm)	b_0 (mm)
OVM.M15(13)-2	140(120)	90(85)	135(120)	85(85)	130(120)	85(85)
OVM.M15(13)-3	170(145)	110(95)	155(135)	95(90)	145(125)	95(90)
OVM.M15(13)-4	198(180)	120(115)	176(150)	110(100)	168(140)	107(100)
OVM.M15(13)-5	220(195)	135(115)	200(170)	120(105)	184(155)	117(105)
OVM.M15(13)-6	240(200)	155(125)	224(180)	135(115)	224(180)	132(115)
OVM.M15(13)-7	260(220)	160(135)	235(200)	140(115)	224(190)	132(115)
OVM.M15(13)-8	275(235)	165(140)	250(210)	150(120)	246(200)	147(120)
OVM.M15(13)-9	295(245)	175(155)	265(225)	155(130)	256(210)	153(128)
OVM.M15(13)-10	310(260)	180(155)	280(235)	170(141)	290(232)	170(141)
OVM.M15(13)-11	325(270)	185(165)	295(245)	170(145)	290(232)	170(141)
OVM.M15(13)-12	340(285)	190(180)	310(260)	170(150)	290(245)	170(141)
OVM.M15(13)-13	355(300)	195(190)	320(270)	175(160)	300(255)	170(150)
OVM.M15(13)-14	365(310)	210(195)	330(280)	180(165)	320(255)	178(150)
OVM.M15(13)-15	380(316)	220(195)	345(290)	185(165)	330(275)	185(155)
OVM.M15(13)-16	390(330)	235(200)	355(300)	195(170)	335(285)	185(155)
OVM.M15(13)-17	405(340)	250(205)	370(310)	210(175)	345(295)	187(155)
OVM.M15(13)-18	445(350)	255(205)	380(315)	215(175)	355(300)	190(170)
OVM.M15(13)-19	430(360)	255(215)	390(325)	215(180)	365(310)	190(170)
OVM.M15(13)-21	455(380)	268(225)	410(345)	223(190)	390(325)	205(180)
OVM.M15(13)-22	485(390)	270(230)	415(350)	225(195)	410(330)	205(180)
OVM.M15(13)-25	500(410)	285(240)	450(375)	235(200)	425(350)	220(190)
OVM.M15(13)-27	510(430)	295(250)	460(390)	245(210)	435(370)	220(190)
OVM.M15(13)-37	600(500)	350(285)	545(460)	295(250)	510(430)	270(221)
OVM.M15(13)-43	645(545)	405(320)	585(495)	340(270)	555(465)	300(240)
OVM.M15(13)-55	730(610)	440(360)	660(555)	370(300)	620(520)	330(270)

Features of OVM External Prestressing Systems

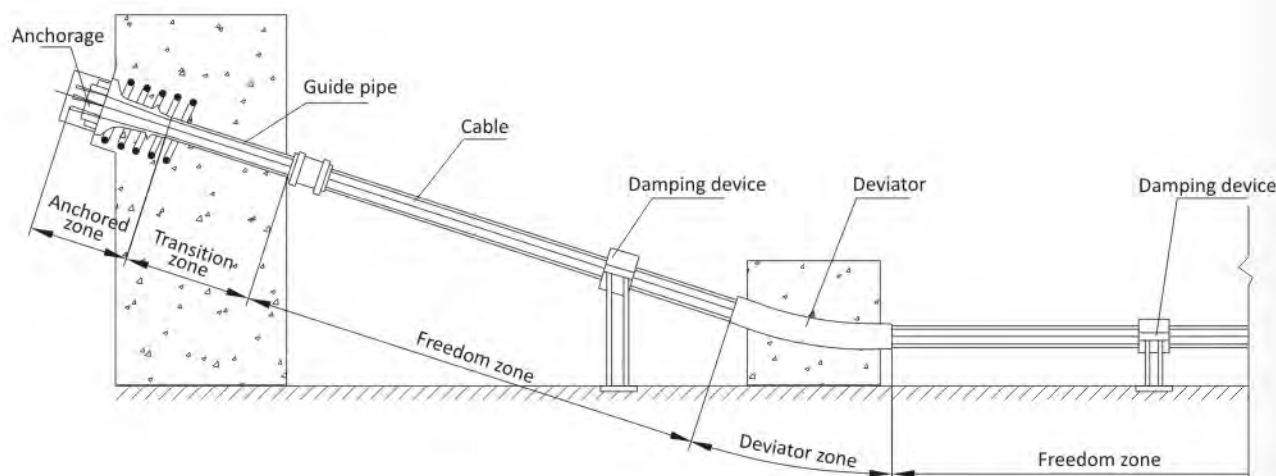
- Conform to the Recommendations for the *Acceptance of Post-tensioning Systems & External Prestressing Material and System* by the international FIP , Chinese National Standard of *GB/T 14370-2007 Anchorage, Grip and Coupler for Prestressing Tendons* and Chinese National Standard of *GB/T 30827-2014 Technical Conditions for External Prestressing Tendons*.and Chinese National Standard of *GB/T 30827-2014 Technical Conditions for External Prestressing Tendons*.
- Durable, with excellent anti-corrosive and anti-fatigue property. Special damping device is equipped to reduce the tendon vibration.
- Easy to inspect, maintain and replace the tendon.
- Low radius deviator, reduced stress concentration at deviating area.

Basic Components of OVM External Prestressing Systems

The basic components of external prestressing system include:

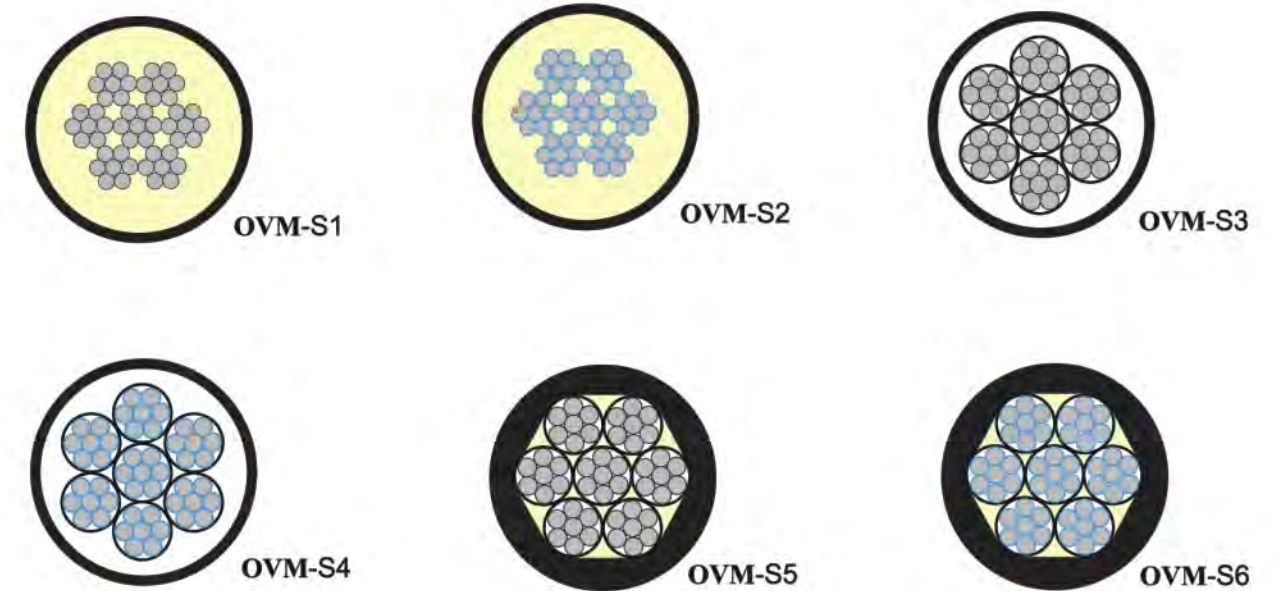
- External cables, ducts and grouting materials
- Anchorage system
- Deviating device
- Anti-corrosion system
- Damping device

OVM External Prestressing System



Anti-corrosion System of External Prestressing Cables

There are six types of OVM external prestressing cables: OVM-S1, OVM-S2, OVM-S3, OVM-S4, OVM-S5 and OVM-S6.



Basic components of external prestressing cables

Type	OVM-S1	OVM-S2	OVM-S3	OVM-S4	OVM-S5	OVM-S6
Strand Type	Bare strand	Epoxy-coated strand	Unbonded strand	Epoxy-coated unbonded strand	Unbonded tendon	Epoxy-coated unbonded tendon
Duct	HDPE sheath		HDPE sheath		Hot extruded HDPE	
Grouting	Mortar, epoxy, grease		No grout on free length		No grout on free length	

Cables of Type OVM-S3, OVM-S4, OVM-S5 & OVM-S6 are not grouted along their free length. These types of cables can be inspected and replaceable during their service duration if necessary. The cable is self-protective with each strand's anti-corrosion solution. The external HDPE sheath is setup to protect internal unbonded tendons. Cables of Type OVM-S3, OVM-S4 consist

multiple unbonded strands and sheathed by HDPE pipe. Individual strand deviator (Distributed Deviator) could be adopted and enable its single strand to be replaceable. Cables of Type OVM-S5, OVM-S6 consist multiple unbonded strands and strands are capsuled in HDPE pipe. Deviating pipe (Integral Deviator) could be adopted and integral cable is replaceable.

Deviating Device

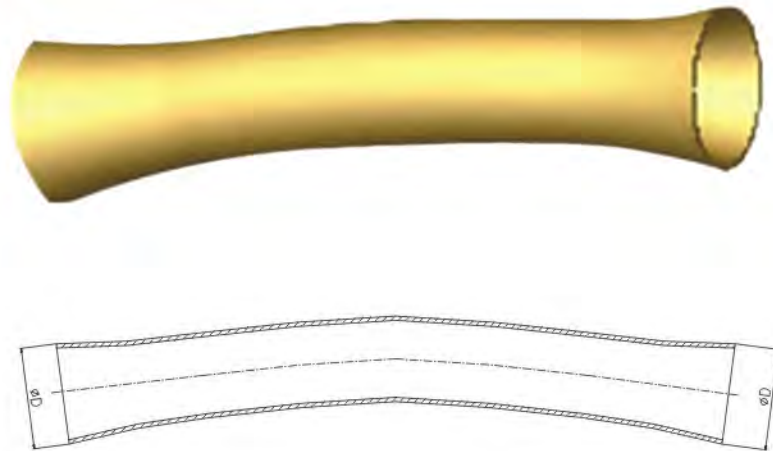
The Deviating devices are important components of the external cable assembly. In bridges girders, they are the only parts linking to the concrete on the full external cable length except the anchoring zone, and function to deviating direction of cable and transfer lateral cable loads.

The Deviating devices of OVM External Cable System comprise of Individual Strand Deviator and Integral Deviator, upon to their tendons patterns passing through it.

The Individual Strand Deviator usually consists of guide tube, entrance plate, diaphragm and ZH mortar, fits to cables of Type OVM-S3/S4 and capable of individual strand replaceable.

The Integral Deviator is shaped from seamless steel pipe, fits to cables of Type OVM-S5/S6 and cable replacement could be done by way of whole cable removal.

Intergrated Deviator

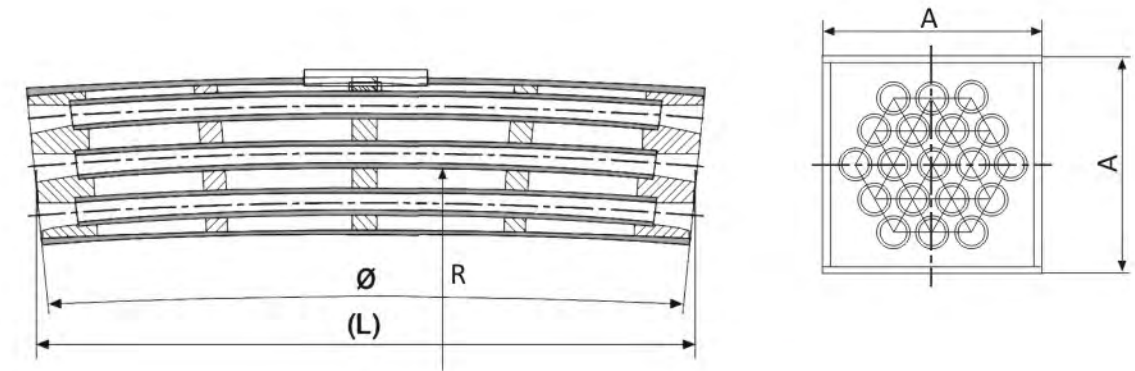


Integral deviator data

Unit in mm.

Spec.	Size	φD	Rmin
15-7		φ109	2000
15-12		φ127	2500
15-19		φ146	3000
15-27		φ168	3500
15-31		φ180	4000

Individual Strand Deviator



Individual strand deviator data

Unit in mm.

Spec.	Size	SquareAxA	Cir.φA	Rmin
15-7		110x110	φ121	2000
15-12		140x140	φ152	2500
15-19		161x161	φ180	3000
15-27		195x195	φ203	3500
15-31		208x208	φ219	4000

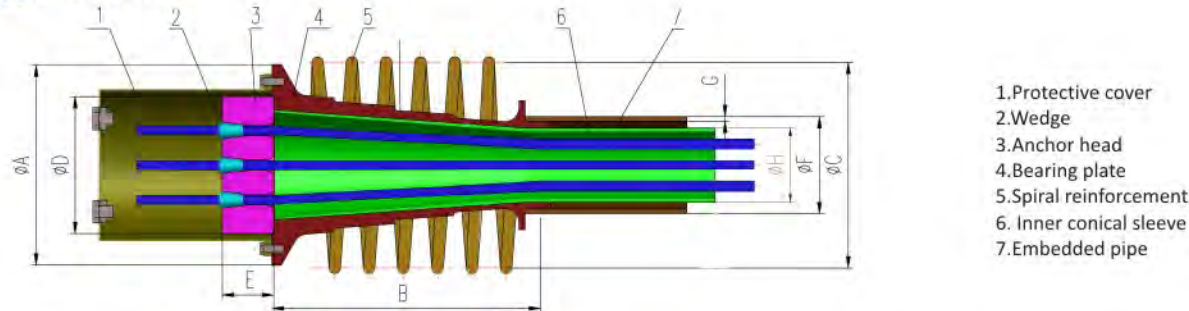


OVM External Prestressing System applied on Sutong Bridge, China

OVM External Prestressing Anchorages

Based on the matured OVM PT anchorage, various external prestressing anchorages with different structure are designed to meet particular requirements of projects.

Type OVM.TM



Type OVM.TM External Prestressing Anchorage diagram

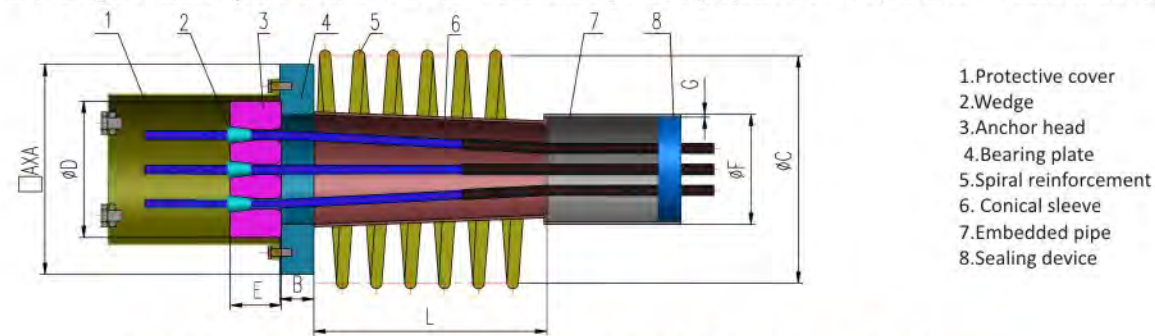
Main Dimensions

Unit:mm

Spec.	Anchor head	Bearing plate	Spiral reinforcement	Inner conical sleeve	Embedded pipe
	φ Dx E	φ Ax B	φ C	φ H	φ Fx G
OVM.TM 15-7	φ 130x55	φ 190x170	200	φ 75	φ 102x5
OVM.TM 15-12	φ 175x65	φ 235x230	250	φ 90	φ 133x5
OVM.TM 15-19	φ 206x75	φ 300x325	350	φ 110	φ 133x5
OVM.TM 15-22	φ 240x90	φ 330x350	380	φ 125	φ 159x5
OVM.TM 15-27	φ 260x110	φ 360x430	400	φ 125	φ 159x5
OVM.TM 15-31	φ 275x130	φ 390x415	430	φ 140	φ 180x5
OVM.TM 15-37	φ 310x130	φ 420x510	470	φ 150	φ 194x6
OVM.TM 15-43	φ 340x150	φ 460x585	510	φ 160	φ 203x6

Type OVM.A

The anchorage's sealed space is filled with non-solidified agents, e.g., grease or wax, to enable cable to be replaceable.



Type OVM.A External Prestressing Anchorage diagram

Main Dimensions

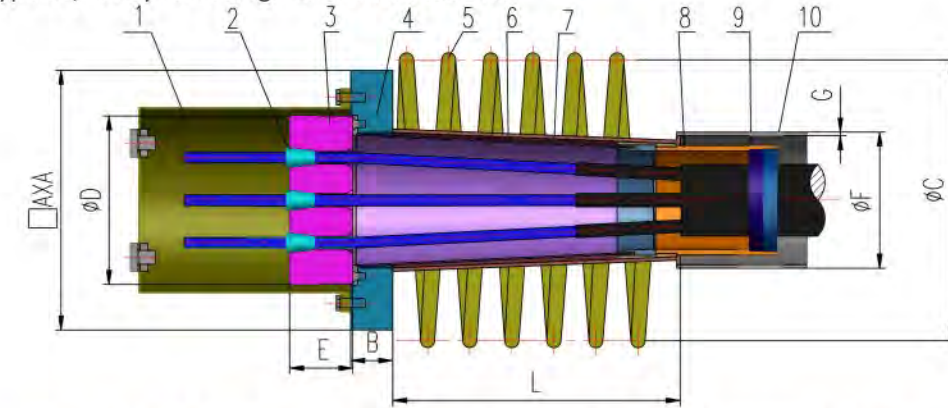
Unit:mm

Spec.	Anchor head	Bearing plate	Spiral reinforcement	Conical sleeve	Embedded pipe
	φ Dx E	Ax Ax B	φ C	L	φ Fx G
OVM.A 15-7	φ 157x60	240x240x45	φ 240	265	φ 133x5
OVM.A 15-12	φ 175x70	300x300x45	φ 270	301	φ 146x6
OVM.A 15-19	φ 240x90	370x370x60	φ 400	555	φ 194x6
OVM.A 15-27	φ 260x110	420x420x60	φ 430	630	φ 203x6
OVM.A 15-31	φ 275x130	470x470x75	φ 470	765	φ 219x6

Type OVM.TA

Based on Type OVM.A anchorage, a sleeve lined inside of outer conical sleeve and cement mortar will be filled in to protect anchoring section of strands. It fits to cable Type S5, S6. By removing the lined sleeve inte-

grally, integral cable could be replaced. It has the same overall dimensions of anchorage Type OVM.A.

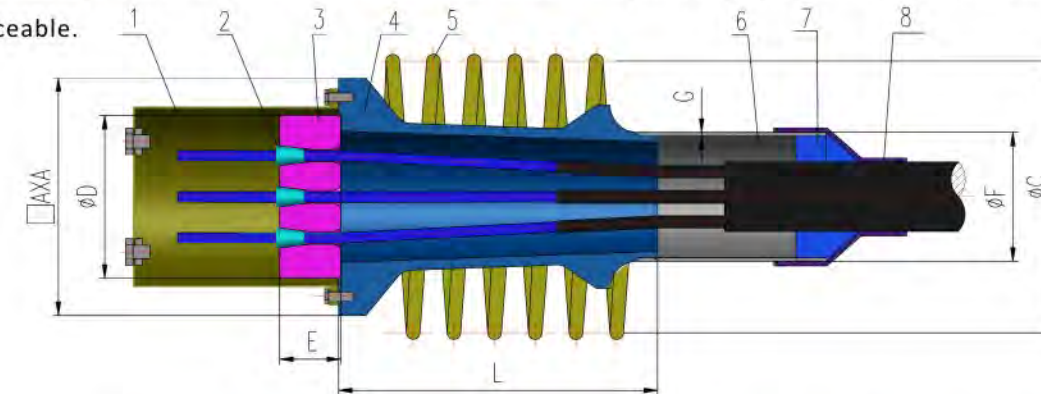


Type OVM.TA External Prestressing Anchorage diagram

1.Protective cover 2.Wedge 3.Anchor head 4.Bearing plate 5.Spiral reinforcement 6.Cone sleeve 7.Isolating device 8.Sealing chamber 9.Sealing device 10.Embedded pipe

Type OVM.TS

The anchorage's sealed space is filled with non-solidified agents, e.g., grease or wax, to enable cable to be replaceable.



Type OVM.TS External Prestressing Anchorage Diagram

1.Protective cover 2.Wedge 3.Anchor head 4.Bearing plate 5.Spiral reinforcement 6.Embedded pipe 7.Sealing chamber 8. Heat shrinkable sleeves

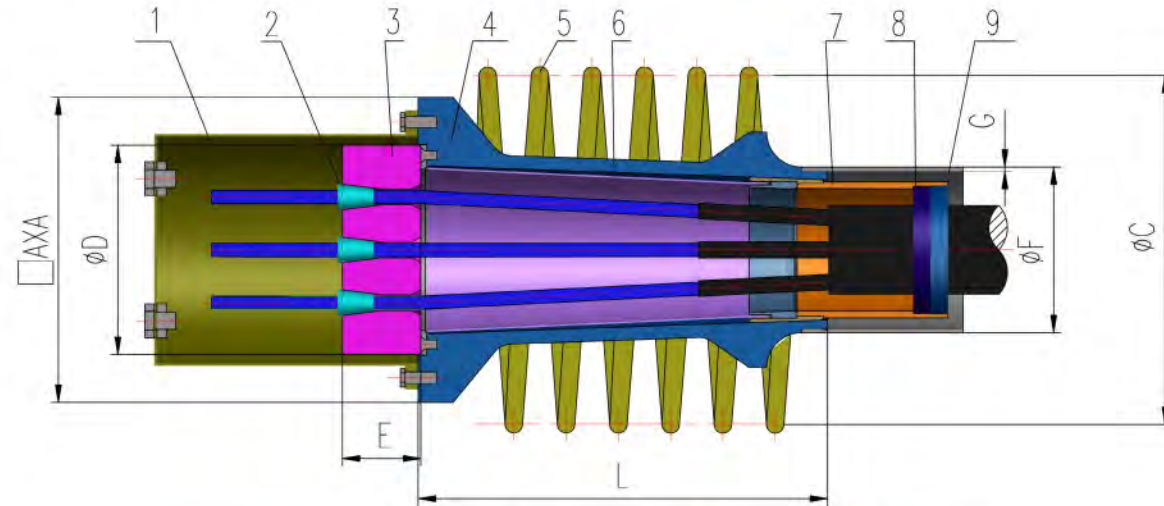
Main Dimensions

Unit:mm

Spec.	Anchor head	Bearing plate	Spiral reinforcement	Embedded pipe
	φ Dx E	Ax Ax B	φ C	φ Fx G
OVM.TS 15-7	φ 157x60	240x240x290	φ 240	φ 133x5
OVM.TS 15-12	φ 175x70	285x285x340	φ 270	φ 146x6
OVM.TS 15-19	φ 240x90	350x350x470	φ 400	φ 194x6
OVM.TS 15-27	φ 260x110	410x410x495	φ 430	φ 203x6
OVM.TS 15-31	φ 275x130	465x465x565	φ 470	φ 219x6

Type OVM.TT

Based on Type OVM.TS anchorage, a sleeve lined inside of outer conical sleeve and cement mortar will be filled in to protect anchoring section of strands. It fits to cable Type S5, S6. By removing the lined sleeve integrally, integral cable could be replaced. It has the same overall dimensions of anchorage Type OVM.S.

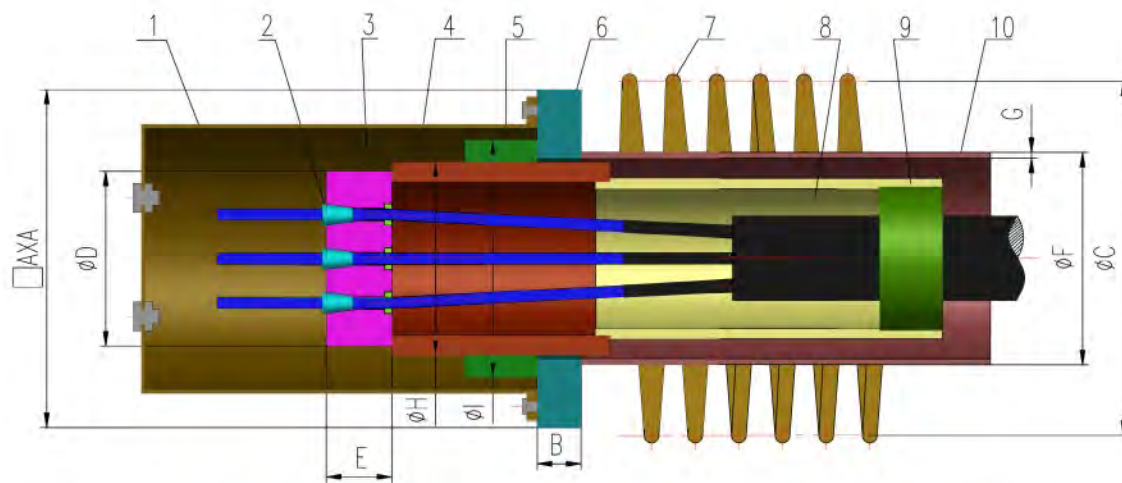


Type OVM.TT External Prestressing Anchorage Diagram

- 1.Protective cover 2.Wedge 3.Anchor head 4.Bearing plate 5.Spiral reinforcement 6.Isolating device 7.Sealing chamber
- 8.Sealing device 9.Embedded pipe

Type OVM.TSK

By using Type OVM.TSK anchorage, the cable force can be adjusted during bridge service period. It is also capable of cable replaceable.



Type OVM.TSK External Prestressing Anchorage Diagram

- 1.Protective cover 2.Wedge 3.Anchor head 4.Socket 5.Nut 6.Bearing plate 7.Spiral reinforcement 8.Sealing chamber
- 9.Sealing device 10.Embedded pipe

Main Dimensions

Unit in mm

Spec.	Anchor head	Bearing plate	Spiral reinforcement	Socket	Nut	Embedded pipe
	$\phi D \times E$	AxAxB	ϕC	ϕH	ϕI	$\phi F \times G$
OVM.TSK 15-7	$\phi 150 \times 70$	285x285x30	$\phi 270$	$\phi 160$	$\phi 210$	$\phi 187 \times 6$
OVM.TSK 15-12	$\phi 205 \times 80$	360x360x40	$\phi 380$	$\phi 220$	$\phi 270$	$\phi 245 \times 6.5$
OVM.TSK 15-19	$\phi 230 \times 100$	420x420x50	$\phi 430$	$\phi 245$	$\phi 305$	$\phi 273 \times 7$
OVM.TSK 15-27	$\phi 270 \times 100$	490x490x60	$\phi 510$	$\phi 285$	$\phi 340$	$\phi 310 \times 8$
OVM.TSK 15-31	$\phi 270 \times 110$	500x500x65	$\phi 510$	$\phi 285$	$\phi 340$	$\phi 310 \times 8$

Damping Device

Traffic loads induce vibration to the structures and cables. If natural frequency of cable is close or coincident to that of the structure, resonance vibration may occurs, which will bring safety risks or even damages to whole structure. In order to stagger natural frequency of cable to that of whole structure, it is necessary to install damping devices at proper positions on free length of cables, with which to shorten cable vibrating length, to suppress vibrating amplitude, so as to avoid any harmfulness caused from vibration.



Applications



Sadr Bridge, Iran, 2012



BEIJING-SHANGHAI HIGH-SPEED RAILWAY, CHINA
Total length 1,318km
2011
Supply of post-tensioning system



ALGERIA EAST-WEST HIGH WAY, ALGERIA
2010
Supply of PT for Lot Unique Centre & West



BOUBYAN ISLAND SEAPORT PROJECT (PHASE 1, STAGE 1), KUWAIT
Bridge part includes a 1.42km road bridge and a 4.25km railway bridge across Subiya Straits
2011
Supply of post-tensioning system



QINGDAO JIAOZHOU BAY BRIDGE, CHINA
Total length 41.58km
2011
Supply of post-tensioning system



North-south Railway, KSA
2011
Supply of anchorage, bearings and expansion joints



INCHEON BRIDGE, KOREA
Total length 21.38km
2009
Supply of post-tensioning system



FUQING NUCLEAR POWER PLANT, CHINA
2008
Supply and supervision of PT for containment



SHUINAN GRAND BRIDGE AT HURONGXI HIGHWAY, CHINA
Left bridge 917.75m, right bridge 953.23m, highest pier 98m
2008
Supply and installation of PT