Technical Submittal – Dywidag Tension Bars and Anchor Plates

Project Name & Number:	Project Olympus MCL3111
Document Reference:	LCY11-KTB-ZZ-XX-TS-X-00006
Revision:	P01
Purpose Of Issue	S5 - Suitable for Review and Acceptance

Document Control Sheet

Rev.	Status	Date	Revision Note	Author	Approver
P01	S5	06-03-25	First Isse	GS	GS

Technical Submittal Information: (to be completed by Sub-Contractor)

Sub-Contractor:	Keltbray
Works Package Number:	
Description:	Dywidag Tension Bars and Anchor Plates
Associated Specification Reference(s):	LCY10-CDL-XX-XX-SP-GE-50001
Associated Drawing Number(s):	LCY11-BGL-B1-BF-DR-S-30220 LCY11-BGL-B1-BF-DR-S-30221 LCY11-BGL-B1-XX-DR-S-01005 LCY11-BGL-B1-XX-DR-S-01006 LCY11-BGL-B1-XX-DR-S-01007 Keltbray Pile Desing Ref LCY11-KTB-B1-ZZ-RP-C-00002 Keltbray Piling Schedule LCY11-KTB-XX-XX-SH-C-00007
Manufacturer(s):	DSI
Material:	Prestressed Steel Bar
Size:	40 and 47mm
Type:	Dywidag Bar
Model Number:	Grade 1050
Manufacture Process:	Machine Rolled (factory)
Area/Location for installation:	Piled Foundation Building 1,2 & 3
Finish/Texture/Pattern/Print:	n/a
Colour:	n/a
Other/Comments:	

Sustainability Information:

Item		**Included (Y / N / N/A) & Comments**
Responsible Sourcing Certification	**Environmental Product Declaration**	No
	TM65 Calculation	No
	BES6001	No
	ISO14001	No
	CARES	No
Product Information	**A1-A3 emissions in tCO2e/t or m3**	No
	Recycled Content Percentage	No
	VOCs Levels	n/a

Please Note:

1. *Index – detailing everything within the technical submittal*
2. *Technical compliance check against schedule and specification of equipment and data sheet (if CDE log not included)*
3. *Project Specific supplier Data Sheets (not maintenance documentation or sales brochure)*
4. *detailed drawings of the equipment if required*
5. *CDE log completed where required*

If relevant points have not been addressed, the Submittal will be QA Rejected.

DYWIDAG Prestressing Steel Threadbar System

DYWIDAG Prestressing Steel Threadbar System

DYWIDAG Prestressing Steel Threadbar is a high tensile alloy steel bar which features a coarse right-hand thread over its full length. The system is proven worldwide and offers versatility in a range of applications.

Manufactured in accordance with the German Certificate of Approval (Deutsches Institut für Bautechnik), the system also offers general conformance with BS 4486 : High Tensile Steel Bars for Prestressing of Concrete. During the steel making process, the threadbars are hot rolled, quenched and tempered, followed by cold working and further tempering, to achieve the necessary performance.

DYWIDAG Prestressing Steel Threadbars, 15mm - 75mmØ are suitable for all static loading applications. Additionally, for post-tensioning and dynamic applications, DYWIDAG Prestressing Steel Threadbars 26.5mm - 40mmØ, see note (c) below, offer a fatigue resistance in excess of 2 million load cycles over a tensile range of 630 - 682N/mm^2 as specified in the European Technical Approval No. ETA - 05/0123 and ETAG 013. Stress relaxation when loaded to 70% *f*pu is less than 3.5% over a 1000 hour period in accordance with BS4486.

Key features of the system are:

- Fully threaded bar – can be cut and coupled at any point.
- Coarse pitch threadform (d/2), right-hand, with two faces ensuring the thread is self cleaning. Ideal for construction site use.
- Low relaxation steel – minimum relaxation during service life.
- Prestressing grade steel – high strength offers weight savings and reduced working diameters.

Technical Data for Prestressing Steel Threadbar

Nominal Diameter	Steel Grade	Ultimate Strength *f*pu	0.1% (a) Proof Strength	70% (b) Ultimate Strength	50% Ultimate Strength	Cross Sectional Area	Diameter Over Threads	Thread Pitch	Bar Weight
mm	N/mm^2	kN	kN	kN	kN	mm^2	mm	mm	kg/m
15	900/1100	195	159	136	98	177	17	10	1.44
20	900/1100	345	283	241	173	314	23	10	2.56
26.5	950/1050	579	523	405	290	551	30	13	4.48
32	950/1050	844	764	591	422	804	36	16	6.53
36	950/1050	1069	967	748	535	1018	40	18	8.27
40	950/1050	1320	1194	924	660	1257	45	20	10.21
47	950/1050	1822	1648	1275	911	1735	52	21	14.10
57	835/1035	2671	2155	1870	1335	2581	64	21	20.95
65	835/1035	3447	2771	2413	1724	3318	71	23	27.10
75	835/1035	4572	3645	3200	2286	4418	82	24	35.90

(a) 0.1% Proof Stress also referred to, in general terms, as Yield Strength - *Ty.* (b) For geotechnical applications 75% *f*pu may be used for proof testing.
(c) Approval Standards: Ø 26.5 - 47mm (grade 950/1050N/mm²) ETA 05/0123 and ETAG 013. Øs 15 & 20mm (grade 900/1100N/mm²) formtie approvals. Øs 57 - 75mm (grade 855/1035 N/mm²) system approval.

Modulus of Elasticity: E = 205,000 N/mm^2 +/- 5%.
Stock Lengths: 15mm - 20mmØ bars, 6.0m; 26.5mm - 75mmØ bars, 12.0m. Tolerances +/- 50mm.
All bar diameters can be cut to length to suit customer requirements.

Couplers for Threadbars

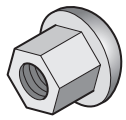
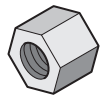
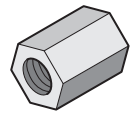
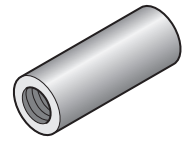
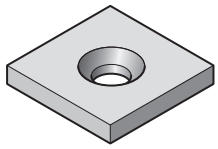
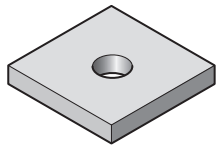
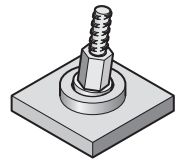
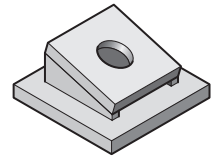
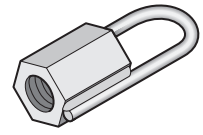
Couplers enable prestressing steel threadbars to be coupled or extended, reliably and efficiently. Coupler strength (for bar Øs 26.5 - 47mm) = 1.27 x Yield Strength, which equates to 1.15 x Ultimate Strength, in accordance with German Approval Certificates. Coupler strengths for other prestressing steel bar grades (bar Øs 15 & 20mm, and 57 - 75mm) exceed the published Ultimate Bar Strengths and are covered by separate approvals (see note C, Technical Data).

Precautions should be taken to ensure that the coupler remains centrally located. This can be achieved through the use of grub screws and/or a centre pin. Marking the two bars with paint or similar at half a coupler length prior to engagement provides visual confirmation of centralisation and is recommended as good working practice.

DYWIDAG Prestressing Steel Threadbar Accessories

Nominal Diameter	Steel Grade	Recessed Plate	Domed Nut		Flat Plate	Lock Nut		Hexagonal Nut		Coupler	
		Stock Size*	AF	Length	Stock Size*	AF	Length	AF	Length	Dia.	Length
mm	N/mm^2	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
15	900/1100	n/a	n/a	n/a	120 x 120 x 12	30	30	30	50	30	105
20	900/1100	n/a	n/a	n/a	120 x 120 x 20	36	30	36	70	40	130
26.5	950/1050	130 x 130 x 35	46	55	130 x 130 x 35	46	25	46	80	50	170
32	950/1050	160 x 160 x 40	55	70	160 x 160 x 40	55	35	55	90	60	200
36	950/1050	180 x 180 x 45	60	90	180 x 180 x 45	60	35	60	110	68	210
40	950/1050	220 x 220 x 50	70	115	220 x 220 x 50	50	25	70	120	70	245
47	950/1050	260 x 260 x 50	80	135	260 x 260 x 50	60	30	80	140	83	270
57	835/1035	n/a	n/a	n/a	285 x 285 x 65	90	35	90	120	95	240
65	835/1035	n/a	n/a	n/a	325 x 325 x 70	90	40	100	130	105	260
75	835/1035	n/a	n/a	n/a	370 x 370 x 80	105	50	105	145	114	290

*Anchor plates can be supplied in any size to suit customer requirements.

Nuts and Couplers	Domed Nut 	Lock Nut 	Hexagonal Nut 	Coupler 
Anchor Plates	Recessed Plate 	Flat Plate 	Articulating Plate up to 30° 	Gusseted Plate up to 45° 
Accessories	Flat Washer 	Tapered Washer up to 15° 	Hemisphere up to 30° 	Lifting Shackle 

Precautions with Prestressing Steel Threadbars

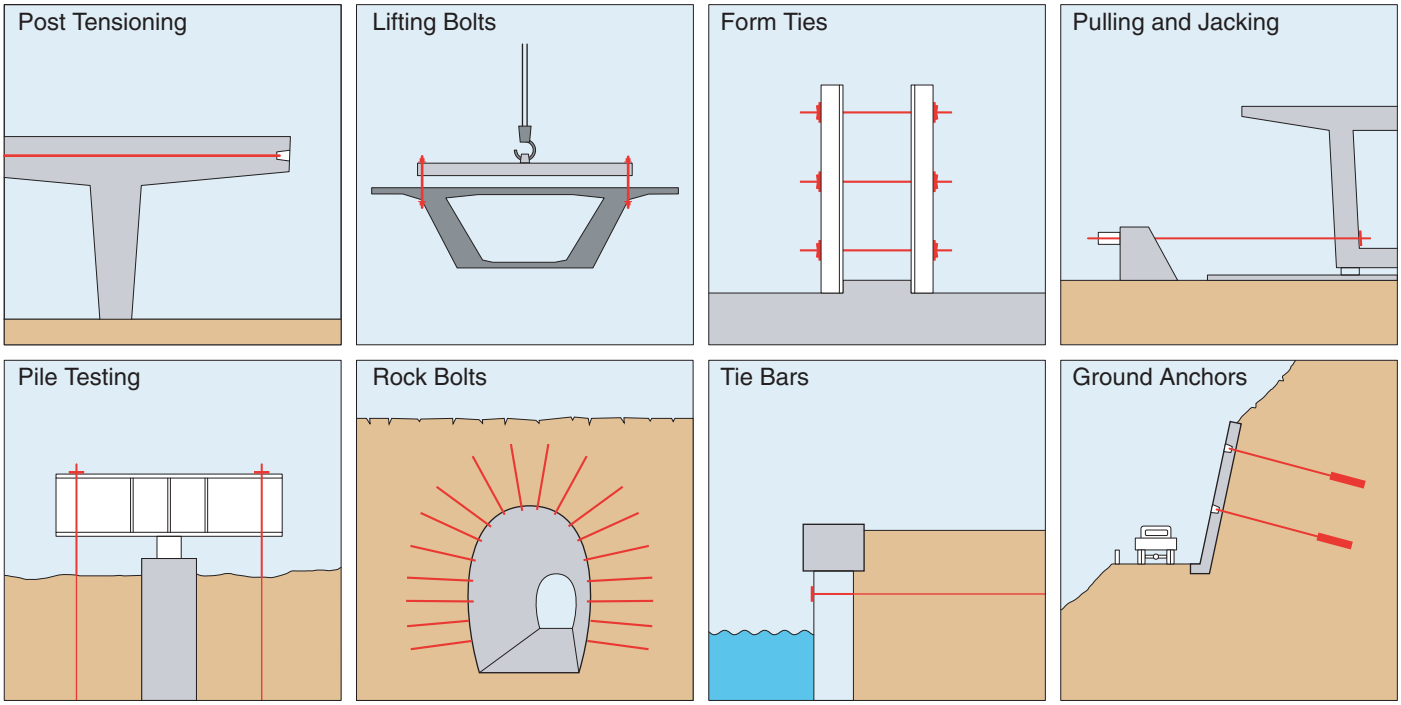
Do	Do Not
✓ Handle with care during loading and installation.	✗ Neglect or throw the bars around.
✓ Cut using a high speed abrasive wheel.	✗ Use oxy-acetylene to cut to length.
✓ Keep dry and free from corrosion.	✗ Allow contact with corrosive soils or atmospheres.
✓ Check safe working loads.	✗ Subject to impact or shear loading.
✓ Support bars during handling to prevent undue bending.	✗ Weld or allow welding sparks in contact.
✓ Use only Ordinary Portland Cement for grouting.	✗ Store near to high induction sources.
✓ Take corrosion protection measures where service life is greater than 2 years.	✗ Use special cements for grouting as corrosive agents may be present in the mix.

Detailed recommendations available on request.

Corrosion Protection

For applications involving service life in excess of 2 years, or shorter lifespans in aggressive environments, sufficient corrosion protection measures are essential. Factory pregrouted encapsulation featuring a bar grouted within a plastic sheath, in accordance with BS 8081, offers a practical and durable solution for permanent geotechnical and structural applications.

Applications

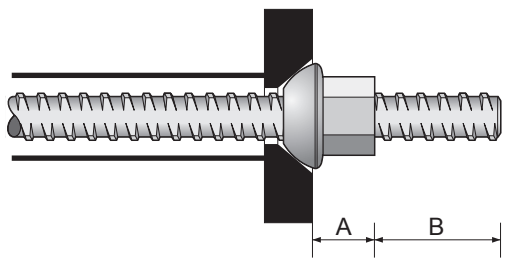


Stressing Equipment

Jack Selection Chart			Bar Diameter mm									
Capacity	**Stroke**	**Weight**	15	20	26.5	32	36	40	47	57	65	75
300kN	50mm	21kg	✓	✓	✓							
600kN	50mm	36kg			✓	✓	✓					
600kN	100mm	44kg			✓	✓	✓					
1100kN	50mm	46kg			✓	✓	✓	✓				
1100kN	150mm	54kg				✓	✓	✓	✓			
1500kN	100mm	140kg						✓	✓	✓		
3000kN	250mm	400kg								✓	✓	✓
4000KN	250mm	650kg									✓	✓

Stressing Dimensions

Nominal Diameter	Steel Grade	Dimension A	Dimension B
mm	N/mm²	mm	mm
15	900/1100	50	50
20	900/1100	70	55
26.5	950/1050	40	60
32	950/1050	50	70
36	950/1050	70	85
40	950/1050	90	125
47	950/1050	105	135
57	835/1035	120	140
65	835/1035	130	150
75	835/1035	145	170



Dimension **B** is the minimum threadbar projection required for stressing.

PST May 2009

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