Stressbar

Westlink M7, Sydney Australia

Darling Harbour, Sydney, Australia

BAR SYSTEMS

VSL have been manufacturing and designing bar systems in Australia for the construction industry since 1971. These have proven to be one of the most popular tools of Engineers wishing to induce and control loads and forces in structures.

The systems range from High Tensile Cold Worked Stressbar to Low Tensile Architectural Tendons, all with compact and easy to assemble fittings.

A range of diameters is available to give a wide selection of tendon forces. The prestressing force is anchored at the end of the bar by a rolled thread, nut, washer and bearing plate. Where necessary, bars can be joined with threaded couplers, and clevis fittings may be used where pin connections are required.

The VSL bar system complies with the requirements of AS4672.

VSL BAR CONFIGURATIONS

VSL Bar System	Thread Details					Architectural Components Available	Max Bar length m Export Containers	
	Full Thread	Short Thread	Right Hand	Left Hand	Cold Rolled		20ft	40ft
CT Stress bar								
20-46mm CT Bar	•	•	•	•	•	•	5.85	7.5+11.85
56mm CT Bar	•	•	•	•	•	•	5.85	7.5+11.85
75mm Bar		•	•	•	•	•	5.85	7.5+11.85
Architectural BAR								
20-90mm MT Bar		•	•	•	•	•	5.85	11.85

Note: 1. Please check with your local VSL office for availability, as some sizes may not be stocked

APPLICATION

VSL bar systems are ideal for the economic application of post tensioning forces on relatively short tendons. Through the use of threaded connections and anchorages they are simple to use and lend themselves to many applications.

TYPICAL APPLICATIONS:

Buildings

- Prestressed Beams and Columns
- Precast Connections

Bridges

- Stay Cable
- Hangers
- Prestressed Segments
- Strengthening
- Tension Piles and Caissons

Wharves & Jetties

- Stressed Deck Planks
- Tie Backs

Anchors

- Permanent and Temporary Ground Anchors
- Uplift Anchors (Dam & Foundation)
- Roof Bolting
- Soil Nails (Slope Stabilisation)
- Crane Bases
- Light Towers

Specialist Engineering

- Heavy Lifting
- Formwork Ties or Hangers
- Frame Ties
- Pile testing
- Architectural Ties

CHARACTERISTIC PROPERTIES

VSL Bar properties are nominally as listed in the Tables. These specifications may be subject to change without notice. Please check with your local VSL office regarding availability.

CORROSION PROTECTION

All bars and fittings must receive protection when installed under permanent conditions. In normal concrete construction the use of galvanised duct, injected with grout, provides good protection. Anchorage recesses must also be filled with cement mortar to protect the ends.

Bars

When bars are used in an exposed environment,one of the following coating systems may be used.

- Single coat of inorganic zinc
- Three coat epoxy paint system
- Greased and sheathed in poly tube
- Galvanising - MT bars only

A combination of the above systems may also be specified. Consideration must also be given to the threaded ends to ensure correct installation of fittings after coating.

Fittings

Fittings may be treated as above but with preference given to galvanising.

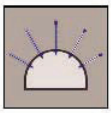
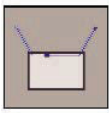
Temporary Bar Anchors

Anchors used in a temporary environment may be used without protection apart from grout cover.

Permanent Bar Anchors

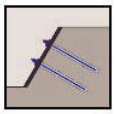
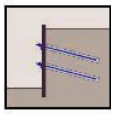
These anchors require installation into corrugated polyethylene sheathing to provide multiple levels of protection. This is accomplished by the internal grout and sheathing barrier. Additional protection may also be used by incorporating the above bar coatings.

ROCK BOLTS

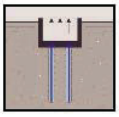
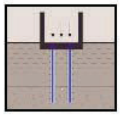
- Stabilising galleries during excavations
- Stabilising unstable rock/soil
- Flexible attachment thanks to the high level of steel elongation/ductility
- A range of different anchoring systems
- Grouted, resin anchors, expansion shells
- A large number of special accessories

SOIL NAILS

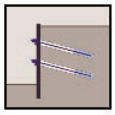
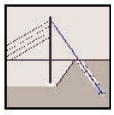
- Slope stabilisation
- Retaining wall strengthening
- Flexible attachment thanks to the high level of steel elongation/ductility
- permitting soil movement
- Permanent and temporary use

MICROPILES

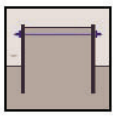
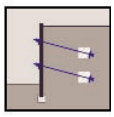
- Foundations (compressive load)
- Tensile piles (tensile load)
- Ideal for alternating tensile and compressive loadings
- Securing of building foundation walls, embankments, compacted soil areas,
- high-rise buildings, structures in seismic areas

GROUND ANCHORS

- Tie-backs
- Retaining walls
- Stabilising deep excavations, anchoring tower cranes
- Permanent and temporary use

TIE RODS

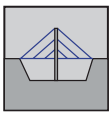
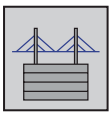



- Tie-backs
- Retaining walls
- Sea walls
- Permanent and temporary use

STRESS BARS


- High performance for forces ranging from 270 to 1,320kN
- Prestressed/post-tensioned concrete structures
- Strengthening of buildings
- Temporary prestressing and bracing

ARCHITECTURAL STRESS BARS

- Foot bridges
- Small road bridges
- Suspended roofs
- Curtain walls

VSL CT STRESSBAR CHARACTERISTIC PROPERTIES

Nominal Dia (mm)	Nominal Area (sq mm)	Nominal Mass (kg/m)	Nominal Tensile Strength (MPa)	Nominal 0.1% Poof Stress. (MPa)	Characteristic Strength kN		Minimum Elongation at max force (%)	Approx. Madulus of Elasticity x 10^3 MPa	Major Dia. of Thread (mm)	Thread Pitch (mm)
					Max. Force	0.1% Proof				
20*	314	2.39	1060	930	325	260	6	205	21.2	6
23*	415	3.46	1060	930	450	385	6	205	25.2	6
26	531	4.4	1060	930	575	495	6	205	28.2	6
29	661	5.44	1060	930	715	615	6	205	31.2	6
32	804	6.59	1060	930	870	750	6	205	34.4	6
36	1018	7.86	1060	930	1050	850	6	205	37.4	6
38*	1134	9.23	1060	930	1225	1055	6	205	40.4	6
40	1257	9.72	1060	930	1295	1050	6	205	41.4	6
46	1662	14.03	1060	930	1710	1390	6	205	49.4	6
56	2463	19.33	1060	930	2460	1995	6	205	57.7	6
75	4185	34.68	1060	930	4418	3580	6	205	77.8	6

Note: 1. Relaxation properties, as per AS 4672, are 4% maximum at 1000 hrs when loaded to 70% of minimum breaking load
2. CT bars may be supplied rolled thread over full length, except 75mm (max 800mm)
3. * Denotes non preferred bar size. Please check with your local VSL office regarding availability
4. 46mm diameter bar in accordance with VSL specifications since this size is not listed in AS 4672

VSL MT600 BAR CHARACTERISTIC PROPERTIES

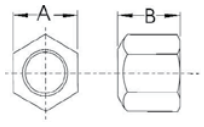
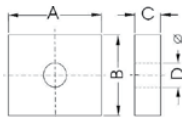
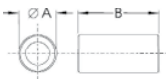
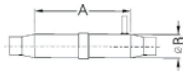
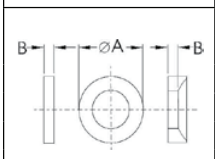
Nominal Dia (mm)	Nominal Area (sq mm)	Nominal Mass (kg/m)	Nominal Tensile Strength (Mpa)	Nominal 0.1% Poof Stress (Mpa)	Characteristic Strength (kN)		Minimum Elongation at max force %	Approx. Madulus of Elasticity x 10^3 Mpa	Major Dia. of Thread (mm)	Thread Pitch (mm)
					Max. Force	0.1% Proof				
20*	314	2.47	620	460	186	138	16	205	21.4	2
30	707	5.55	620	460	416	309	16	205	32	3
36	1018	7.99	620	460	595	441	16	205	38.7	4
39*	1195	9.38	620	460	701	520	16	205	41.7	4
45	1590	12.48	620	460	945	701	16	205	47.8	4
56	2463	19.33	620	460	1475	1095	16	205	58.8	4
60	2827	22.19	620	460	1665	1235	16	205	64.1	6
75*	4418	34.68	620	460	2628	1950	16	205	79.1	6
90*	6362	49.94	620	460	3811	2828	16	205	94.1	6

Note: 1. These specifications may be subject to change without notice
2. * Denotes non preferred bar size. Please check with your local VSL office regarding availability

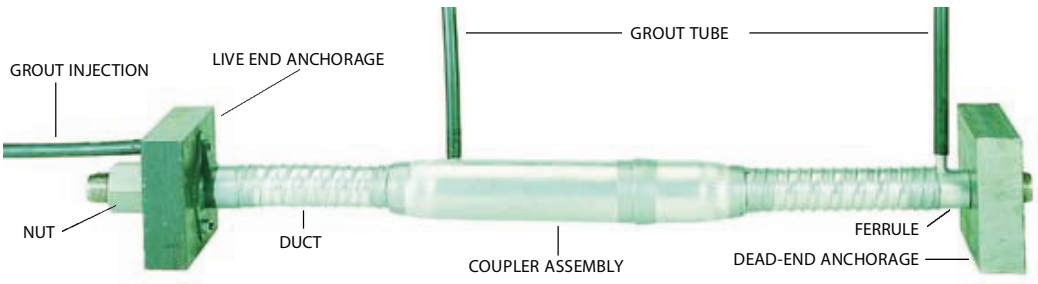
Coat corrosion protection system

Stressing Bar Anchors, Australia

VSL CT STRESSBAR
STANDARD COMPONENT DETAILS (mm)

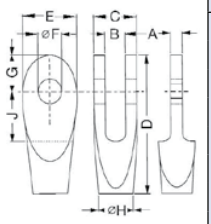
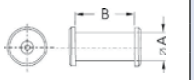
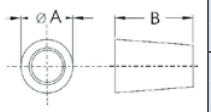
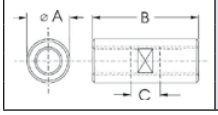
ITEM	BAR DIAMETER		20*	23*	26	29	32	36	38*	40	46	56	75
	Nuts	Part No.	NC20	NC23	NC26	NC29	NC32	NC36	NC38	NC40	NC46	NC56	NC75
		A	33	38	42	47	52	56	62	65	90**	100**	140**
		B	45	45	50	50	55	55	60	66	75	100	120
	Locknuts	Part No.	INC20	LNC23	LNC26	LNC29	LNC32	LNC36	LNC38	LNC40	LNC46	LNC56	LNC75
		B	16	19	22	24	26	29	31	32	40	45	60
	Bearing Plates	Part No.	BP20	BP23	BP26	BP29	BP32	BP36	BP38	BP40	BP46	BP56	BP75
		A	100	130	130	150	150	150	180	180	250	250	300
		B	100	130	130	130	130	150	150	150	200	200	300
		C	32	40	40	40	50	50	50	50	60	70	70
		D	25	29	32	35	38	42	45	47	54	63	80
	Couplers	Part No.	CC20	CC23	CC26	CC29	CC32	CC36	CC38	CC40	CC46	CC56	CC75
		A	36	39	42	45	54	56	60	65	75	85	110
		B	100	100	110	110	120	125	130	130	150	190	250
	Coupler Covers	Part No.	CCV20	CCV23	CCV26	CCV29	CCV32	CCV36	CCV38	CCV40	CCV46	CCV56	CCV75
		A	230	230	230	230	230	230	230	230	250	290	350
		B	57	57	57	57	70	70	70	75	90	96	118
	Flat Washer	Part No.	WF20	WF23	WF26	WF29	WF32	WF36	WF38	WF40	WF46	WF56	WF75
		A	39	50	56	60	66	72	78	84	100	120	150
		B	3	4	4	5	5	6	6	6	8	8	8
	Spherical Washer	Part No.	WS20	WS23	WS26	WS29	WS32	WS36	WS38	WS40	WS46	WS56	WS75
		A	45	45	50	56	64	70	75	80	100	120	160
		B	7	10	10	10	10	10	12	12	12	18	20
	Ducting	Part No.	D40	D40	D40	D40	D45	D45	D50	D55	D60	D70	D95
		A	40	40	40	40	45	45	50	55	60	70	95

Note: 1. * Denotes non preferred bar size. Please check with your local VSL office regarding availability
2. ** Nuts for 46, 56 and 75mm are supplied from round material with peg holes as standard
3. Tapped bearing plates are supplied with a locknut as standard for all sizes other than 56mm and 75mm (56 & 75 diameter have a full nut welded to the bearing plate)



VSL CT STRESSBAR TENDON ARRANGEMENT

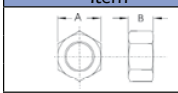
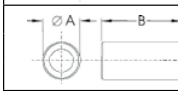
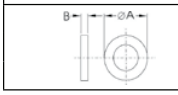
VSL CT STRESSBAR
ARCHITECTURAL COMPONENT DETAILS (mm)

ITEM	BAR DIAMETER		20*	23	26	29	32	36	38*	40	46	56	75
	Spade Clevis	Part No.	CLS20C	CLS23C	CLS26C	CLS29C	SLC32C	CLS36C	CLS38C	CLS40C	CLS46C	CLS56C	CLS75C
		A	25	32	36	40	40	45	50	50	55	80	100
	Forked Clevis	Part No.	CLF20C	CLF23C	CLF26C	CLF29C	CLF32C	CLF36C	CLF38C	CLF40C	CLF46C	CLF56C	CLF75C
		B	28	35	39	43	43	48	53	53	58	83	103
		C	48	59	67	73	77	86	93	93	98	141	189
		D	198	220	240	254	277	294	330	330	363	412	542
		E	66	72	82	98	98	106	130	130	154	168	210
		F	27	31	37	40	43	46	57	57	61	76	101
		G	42	46	54	59	63	68	84	84	100	113	150
		H	42	48	50	56	65	70	80	80	90	110	140
		J	71	79	88	95	109	116	130	131	148	154	222
	Clevis Pin	Part No.	CLP20C	CLP23C	CLP26C	CLP29C	CLP32C	CLP36C	CLP38C	CLP40C	CLP46C	CLP56C	CLP75
		A	26	30	36	39	42	45	56	56	60	75	100
		B	50	60	69	75	79	88	95	95	100	143	191
	Conical Cover (clevis)	Part No.	LNC20S	LNC23S	LNC26S	LNC29S	LNC32S	LNC36S	LNC38S	LNC40S	LNC46S	LNC56S	LNC75S
		A	42	48	50	56	65	70	80	80	90	110	140
		B	50	60	90	100	110	110	120	120	120	160	210
	Conical Cover Coupler & Turnbuckle	Part No.	LNC20T	LNC23T	LNC26T	LNC29T	LNC32T	LNC36T	LNC38T	LNC40T	LNC46T	LNC56T	LNC75T
		A	42	48	50	56	65	70	80	80	90	110	140
		B	70	80	90	100	110	110	120	120	140	160	210
	Turnbuckle Coupler	Part No.	TC20R	TC23R	TC26R	TC29R	TC32R	TC36R	TC38R	TC40R	TC46R	TC56R	TC75R
		A	42	48	50	56	65	70	80	80	90	110	140
		B	170	180	190	200	220	220	230	230	250	280	340
		C	80	90	90	100	100	100	100	100	100	100	100

Note: 1. * Denotes non preferred bar size. Please check with your local VSL office regarding availability

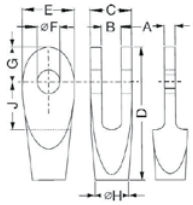
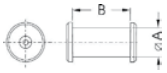
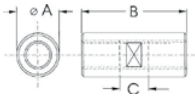
Newmarket Viaduct, Auckland, New Zealand

VSL MT600 BAR
STANDARD COMPONENT DETAILS (mm)

Item	Bar Diameter		20*	30	36	39*	45	56*	60	75*	90*
	NUTS	Part No.	NM20	NM30	NM36	NM39	NM45	NM56	NM60	NM75	NM90
		A	33	47	56	65	90	100	110	140	160
		B	18	25	31	34	38	45	52	63	75
	COUPLERS	Part No.	CM20	CM30	CM36	CM39	CM45	CM56	CM60	CM75	CM90
		A	33	45	54	56	65	80	90	110	125
		B	45	65	77	89	101	117	133	157	192
	FLAT WASHER	Part No.	WF20	WF30	WF36	WF39	WF45	WF56	WF60	WF75	WF90
		A	37	60	72	78	90	100	110	140	160
		B	3	4	5	6	8	9	9	12	12

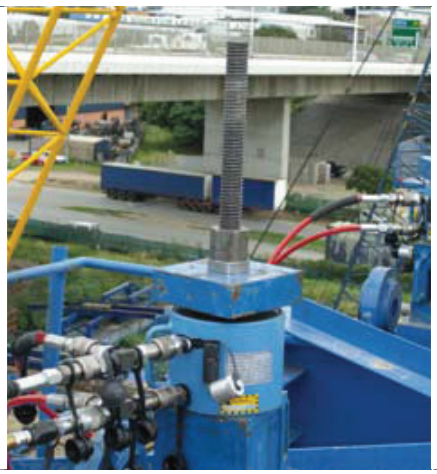
Note: 1. * Denotes non preferred bar size. Please check with your local VSL office regarding availability

VSL MT600 BAR
ARCHITECTURAL COMPONENT DETAILS (mm)

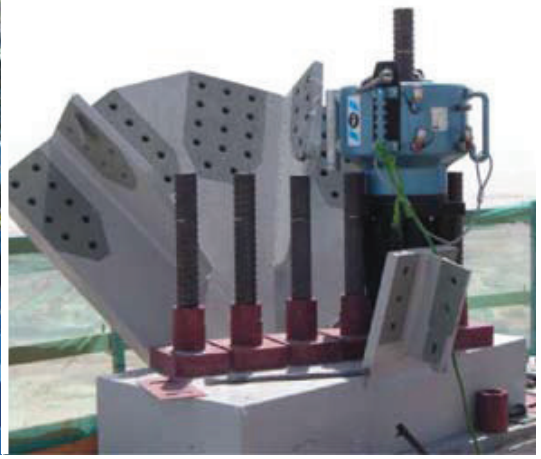
Item	Bar Diameter		20*	30	36	39*	45	56*	60	75*	90*
	SPADE CLEVIS	Part No.	CLSM20C	CLSM30C	CLSM36C	CLSM39C	CLSM45C	CLSM56C	CLSM60C	CLSM78C	CLSM90C
		A	20	25	36	40	45	50	55	80	100
	FORKED CLEVIS	Part No.	CLFM20C	CLFM30C	CLFM36C	CLFM39C	CLFM45C	CLFM56C	CLFM60C	CLFM75C	CLFM90C
		B	23	28	39	43	48	53	58	83	103
		C	39	48	67	73	86	93	98	141	189
		D	173	198	240	254	294	330	363	412	542
		E	52	66	82	98	106	130	154	168	230
		F	22	27	37	40	46	57	61	76	101
		G	34	42	54	59	68	84	100	113	150
		H	33	42	50	56	70	80	90	110	140
		J	34	71	88	95	116	131	148	154	222
	CLEVIS PIN	Part No.	CLPM20C	CLPM30C	CLPM36C	CLPM39C	CLPM45C	CLPM56C	CLPM60C	CLPM75C	CLPM90C
		A	21	26	36	39	45	56	60	75	100
		B	40	50	69	75	88	95	100	143	191
	CONICAL COVER CLEVIS	Part No.	LNM20S	LNM30S	LNM36S	LNM39S	LNM45S	LNM56S	LNM60S	LNM75S	LNM90S
		A	33	42	50	56	70	80	90	110	140
		B	40	50	65	75	90	95	120	140	190
	CONICAL COVER COUPLER & TURNBUCKLE	Part No.	LNM20T	LNM30T	LNM36T	LNM39T	LNM45T	LNM56T	LNM60T	LNM75T	LNM90T
		A	33	48	56	65	80	90	100	120	140
		B	60	70	90	100	110	120	140	160	210
	TURNBUCKLE COUPLER	Part No.	TM20R	TM30R	TM36R	TM39R	TM45R	TM56R	TM60R	TM75R	TM90R
		A	33	45	54	60	65	80	85	110	125
		B	120	150	162	184	196	212	228	252	280
		C	60	90	90	100	100	100	100	100	100

Note: 1. * Denotes non preferred bar size. Please check with your local VSL office for availability

Casey Aquatic Centre, Melbourne, Australia



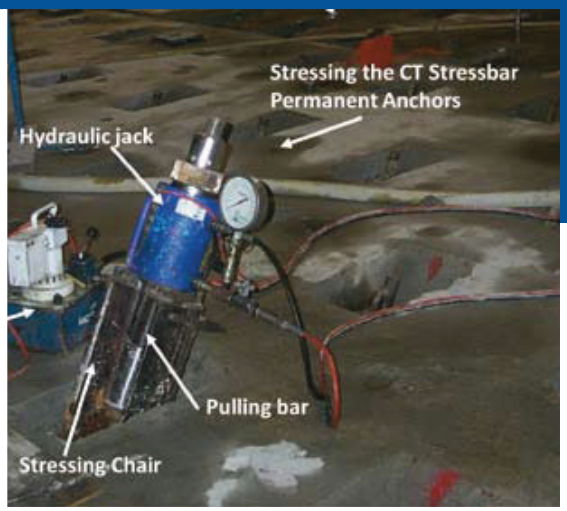
Gateway Upgrade Bridge, Brisbane, Australia



VSL – SAS 950/1050, Dia 75mm, Qatar

Stressbar

Gateway Upgrade Bridge, Brisbane, Australia



Burnley Tunnel, Melbourne, Australia

RECESS DIMENSIONS (mm)

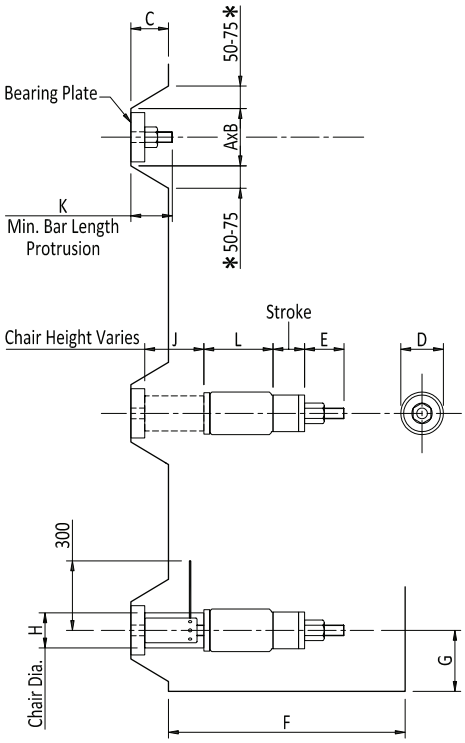
Bar Dia	A	B	C	K
20	145	145	135	140
23, 26	175	175	145	160
29, 32, 36	195	195	160	180
38, 40	225	195	170	200
46	295	245	210	230
56	295	245	240	290
75	345	345	260	340

Hydraulic Stressing Jack and Accessories

JACK CLEARANCE DETAILS (mm)

JACK MODEL	F**	G	H	J
B55	1000	95	125	250
B90	1000	105	150	
B90L	1000	105	150	
B100	1000	110	150	
B100L	1000	110	150	
B150	1000	150	150	
B200	1025	160	200	460
VSL190	1600	220	200	
VSL460	1600	260	250	580

Note: 1. **F dimension based on standard pull bar length
Reduced dimensions may be possible
Please contact your local VSL office



Note: 1. * Denotes 50 for 40 diameter and smaller bars
75 for bars larger than 40 diameter

JACK DETAILS (mm)

Nom Bar Dia	Jack Model	Jack Dimension D	L	E	Stroke	Capacity (kN)	Weight (kg)
20 to 26	B55	165	245	85	125	550	33
29, 36	B90	190	280	105	80	900	48
29 to 36	B90L	190	355	105	150	900	62
38, 40	B100	200	170	130	50	1000	28
38, 40	B100L	200	270	130	150	1000	48
46	B150	275	300	150	150	1500	100
46, 56	B200	300	380	170	150	2000	160
56	VSL190	410	565	220	100	1900	151
75	VSL460	485	510	220	100	4600	425