



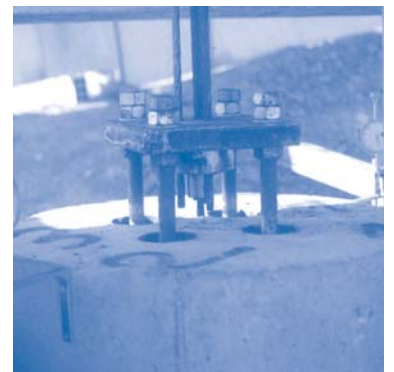
MK4

Innovative Solutions

high tensile bar



high tensile bar



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THE BAR SYSTEM



MAIN FEATURES OF THE MK BAR SYSTEM

MK Bar system is based on special steel high tensile bars manufactured in Germany. More than 20 years of experience in this production are the base of the success of the system.

Depending on the final use of the bars, they are either hot rolled or cold treated, becoming different grades of tensile strength. Low relaxation bar production for post-tensioning is included in the range.

To allow connections and anchoring, a thread through all the length of the bars supplied in the MK bar system is manufactured during the productive processes.

All mechanical properties complies to the DIN EN 10025 standards.

Initially, bars were developed specially for its use in rock and soil anchorages. Post-tensioning, reinforced concrete and stayed structures came latter on.

THREADS

MK Bars are threaded through all their length, allowing the possibility of cutting to the required length in the same sites according to the each detailed project necessities.

QUALITY CONTROLS

The MK Bar system is produced under the strict control of a quality assurance system complying with the specifications of DIN-EN-ISO 9002 and QS-9000 register No 1210111356 TMS, Munchen (Germany)

MK Y1050 SYSTEM

Post-tensioning bar system with continuous threads.

MK Y1050 system uses special high tensile steel bars with low relaxation properties in diameters ranging from 18 mm to 47 mm. A wide range of fittings for a variety of applications is available.

Standard bar length is 12 m, although practically any length can be produced according to the project requirements.

Mechanical properties of bars and thread production is obtained by cold rolling.

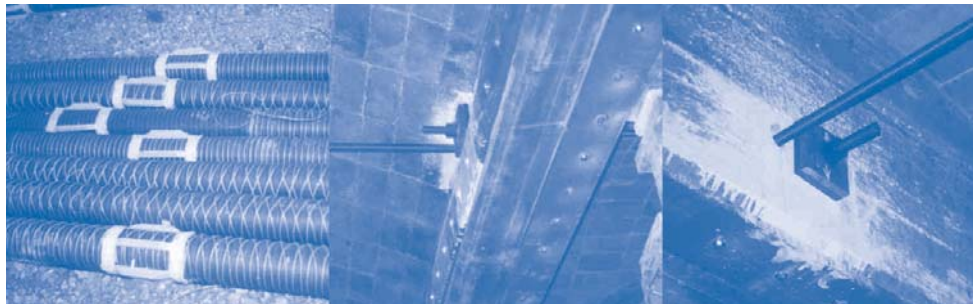
BARS MK Y1050

Quality	Bar Diameter (mm)	Tensile strength (N/mm ²)	Elastic limit (N/mm ²)	Elongation %	Young modulus (kN/mm ²)	Thread
MKY1050	18-47	1050	950	7%	205	DCHA.

Reference	Nom. D. (mm)	Max. D. (mm)	Cross Sect. (mm ²)	Weight (kg/m)	Pitch (mm)	Breaking load (kN)	Y. strength 0,1% kN	Stressing Jack
MKY1050H18	18	21	241	1,96	8	255	230	MH-77
MKY1050H26	26,5	30	551	4,48	13	580	525	MH-77
MKY1050H32	32	36,5	804	6,53	16	850	760	MH-77/MH-123
MKY1050H36	36	40	1020	8,27	18	1070	970	MH-123
MKY1050H40	40	44	1257	10,21	20	1320	1190	MH-123
MKY1050H47	47	52	1735	14,10	21	1820	1650	MH-200

Note: Maximum recommended stressing load is 70% of the minimum breaking load.

Welding: MKY1050 bars should never be welded, nor exposed to local heating, nor splashed with any weld metal.



APPLICATIONS

Main applications of the MK Y1050 bars can be summarised as follows:

- Rock and ground anchors
- Post-Tensioning connections
 - Concrete to concrete
 - Concrete to steel
 - Steel to steel
- Temporary hangers
- Holding down bolts
- Prestressed concrete
- Post-Tensioning of slabs
- Connections of beams in bridges
- Heavy lifting

- Foundations
- Stabilization of slopes and dams
- Hangers for form-work
- Scaffolding

FITTINGS

The MK Y1050 SYSTEM offers a wide range of anchorage systems (live or dead ends, semi-bonded dead ends,...)

Dynamical loads:

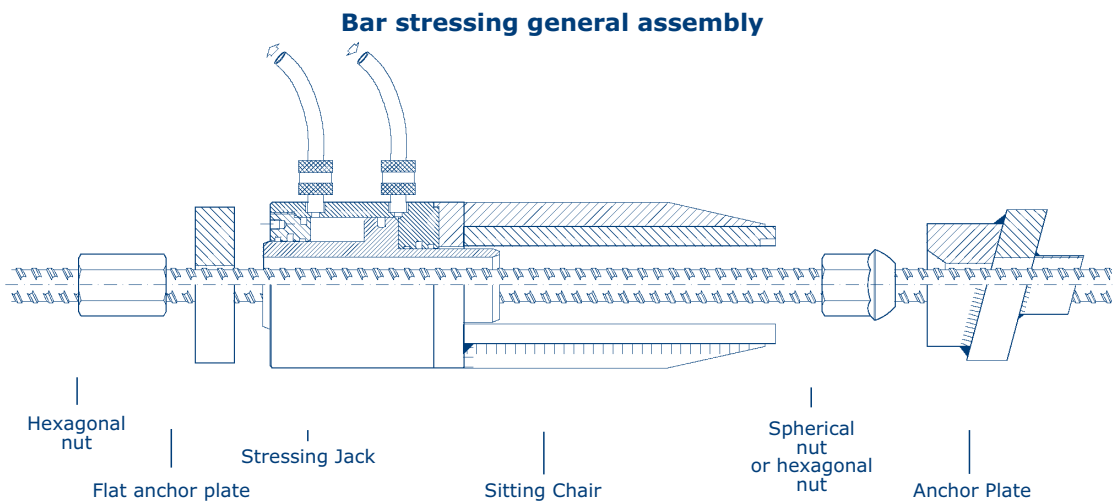
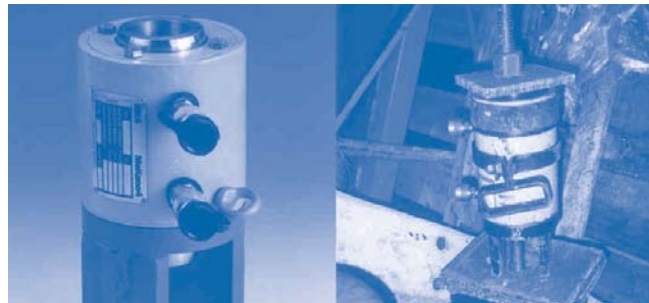
When the bars are under frequent and high amplitude dynamical loads (i.e. windy conditions), the MK Y1050 system offers a set of conical fittings to be used in these applications.



STRESSING AND GROUTING

MK4 provides a complete service of stressing and grouting for the bar system in the case that assistance is required. Equipment is also available for rental and/or sale.

Related equipment includes hollow stressing jacks, hydraulic pumps and the grouting equipment that allow for the proper performance of post-tensioning and injection operations.



FITTINGS MK Y1050

Nominal Diameter	18	26,5	32	36	40	47
------------------	----	------	----	----	----	----

Spherical nut

Reference	MM18TES	ML26TES	ML32TEA	ML36TES	ML40TES	MM47TES
L (mm)	60	60	75	90	100	125
D(mm)	62	62	72	80	90	105
e/c (mm)	46	46	55	60	65	80
Weight (kg)	0,80	0,65	1,1	1,5	1,75	3,75

Anchor plate for spherical nut

Reference	MM18E00S	MM26E00S	MM32E00S	MM36E00S	MM40E00S	MM47E00S
L (mm)	120	140	160	180	200	240
E(mm)	30	30	40	45	50	55
D1 (mm)	38	38	45	50	50	60
D2 (mm)	62	62	72	82	92	106
Weight (kg)	3,50	4,00	7,20	10,50	14,40	22,00


Flat hexagonal nut

Reference	MM18THS	MM26THS	MM32THS	MM36THS	MM40THS	MM47THS
L (mm)	60	80	90	110	120	130
e/c (mm)	41	46	55	60	70	80
Weight (kg)	0,57	0,75	1,20	1,65	2,65	3,89

Anchor plate for hexagonal nut

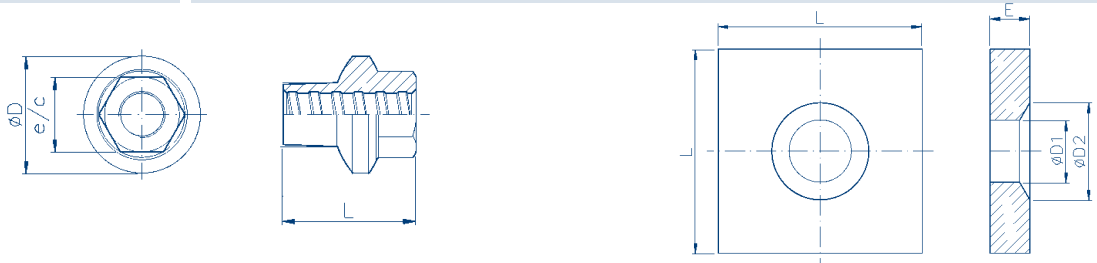
Reference	MM18P00S	MM26P00S	MM32P00S	MM36P00S	MM40P00S	MM47P00S
L (mm)	120	140	160	180	200	240
E (mm)	20	30	40	45	50	55
D (mm)	25	32	38	45	50	58
Weight (kg)	2,20	4,50	7,70	11,00	15,00	24,00



FITTINGS MK Y1050

Conical nut						
Reference	MM18TDS	MM26TDS	MM32TDS	MM36TDS	MM40TDS	MM47TDS
L (mm)	55	80	98	108	125	145
D(mm)	50	70	86	90	100	120
e/c (mm)	32	46	55	60	70	80
Weight (kg)	0,40	0,77	1,40	1,60	2,55	4,05

Anchor plate for conical nut						
Reference	MM18D00S	MM26D00S	MM32D00S	MM36D00S	MM40D00S	MM47D00S
L (mm)	120	140	180	200	220	260
E(mm)	20	30	35	40	45	50
D1 (mm)	37	47	56	61	66	75
D2 (mm)	50	70	86	90	100	120
Weight (kg)	2,10	4,20	8,10	11,70	15,40	24,45

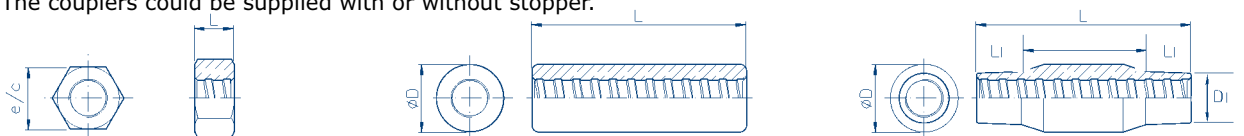


Lock nut						
Reference	MM18CTHS	MM26CTHS	MM32CTHS	MM36CTHS	MM40CTHS	MM47CTHS
L (mm)	20	20	20	25	25	30
e/c (mm)	41	46	55	60	70	80
Weight (kg)	0,18	0,20	0,30	0,45	0,60	0,90

Flat coupler *						
Reference	MM18MFRS	MM26MFRS	MM32MFRS	MM36MFRS	MM40MFRS	MM47MFRS
L (mm)	110	160	190	215	230	250
D (mm)	40	56	60	63	71	85
Weight (kg)	0,88	2,40	3,02	3,54	4,88	7,73

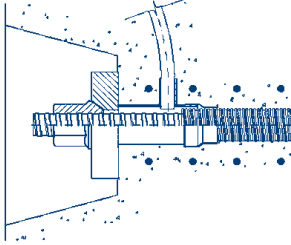
Conical coupler						
Reference	MM18MEDS	MM26MEDS	MM32MEDS	MM36MEDS	MM40MEDS	MM47MEDS
L (mm)	110	160	200	215	250	265
D(mm)	40	56	60	65	71	85
L1 (mm)	22	30	40	45	45	50
D1 (mm)	28	38	47	52	58	68
Weight (kg)	0,55	1,45	2,05	2,48	3,65	5,15

* Note: The couplers could be supplied with or without stopper.

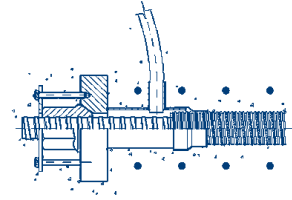


Anchorage General Assembly

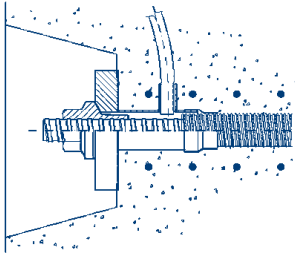
Spherical live end



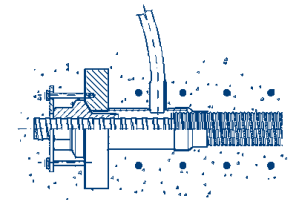
Spherical dead end



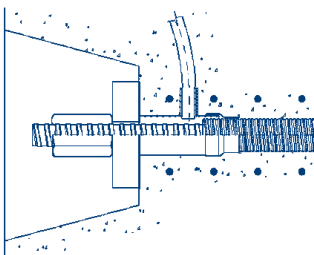
Conical live end



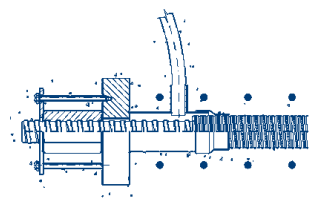
Conical dead end



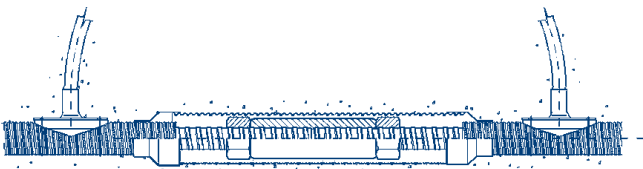
Hexagonal live end



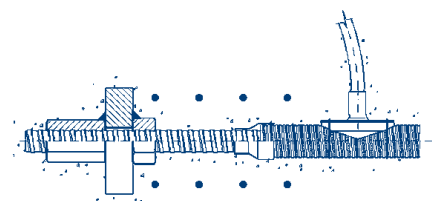
Hexagonal dead end



Coupler



Semibonded dead end



MK B500 SYSTEM

Bars for geotechnics and steel reinforcement

MK B500 system uses special steel bars with diameters ranging from 12 mm to 63.5 mm. A complete set of fittings for different applications of the system is also available.

The bars are produced by hot rolling, thus creating the continuous threaded bar.

BARS MK B500

Quality	Bar Diameter (mm)	Tensile strength (N/mm ²)	Elastic limit (N/mm ²)	Elongation %	Young modulus (kN/mm ²)	Thread*
BSt500	16-50	550	500	10%	205	LEFT
S555	63,5	700	555	10%	205	LEFT

Reference	Nominal D. (mm)	Maximum D. (mm)	Cross Section (mm ²)	Weight (Kg/m)	Pitch (mm)	Min. Breaking load kN	Yield strength 0,1% kN
MKB500S12	12	13	113	0,89	7	65	57
MKB500S16	16	18	201	158	8	110	100
MKB500S20	20	23	314	2,47	10	175	160
MKB500S25	25	29	491	3,85	12,5	270	245
MKB500S28	28	32	616	4,83	14	340	310
MKB500S32	32	36	804	6,31	16	440	405
MKB500S40	40	45	1260	9,87	20	690	630
MKB500S50	50	56	1960	15,40	26	1080	980
MKB500S63	63,5	70	3167	24,80	21	2215	1760

* Right hand thread only under special order

APPLICATIONS

Applications of the MK B500 bars are multiple, although two main ones are their use in reinforced concrete or as a soil and rock anchors. Applications can be summarised as follows:

- Rock and ground anchorages
- Tunnel and mining nails
- Reinforcing steel at special locations of reinforced concrete
- Stabilization of slopes and dams
- Construction joints
- Micro piles
- Stays and Hangers in cable stayed, suspension or arch structures.

MK B500 bars offer a wide set of fittings for all the needs of the customer during the project phase and/or during the construction phase.

MKB500 bars may be welded. Its use as Post-tensioning steel is not recommended, due to the fact of its tensile strength and normal relaxation properties.

FITTINGS MK B500

Nominal D.	12	16	20	25	28	32	40	50	63,5
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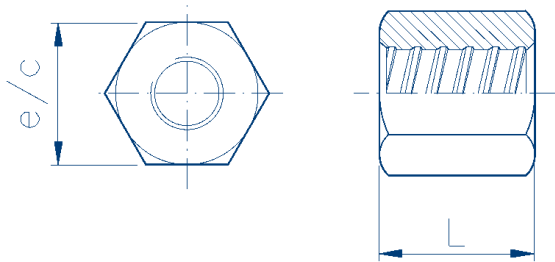
Nut

Reference	MB12THS	MB16THS	MB20THS	MB25THS	MB28THS	MB32THS	MB40THS	MB50THS	MB63THS
L (mm)	20	40	45	50	55	60	70	85	115
e/c (mm)	19	32	36	41	46	55	65	80	108
Weight (Kg)	0,05	0,20	0,30	0,40	0,50	0,86	1,35	2,35	5,00

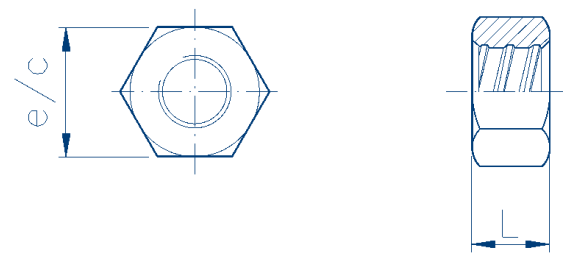
Lock nut

Reference	MB12CTHS	MB16CTHS	MB20CTHS	MB25CTHS	MB28CTHS	MB32CTHS	MB40CTHS	MB50CTHS	MB63CTHS
L (mm)	20	20	20	20	25	30	35	50	65
e/c (mm)	19	32	32	41	41	50	60	80	90
Weight (Kg)	0,05	0,10	0,10	0,15	0,20	0,35	0,50	1,45	2,37

Hexagonal nut



Lock nut



Compression coupler

Reference	----	----	----	----	----	MB32MCS	MB40MCS	MB50MCS	----
L (mm)	----	----	----	----	----	90	120	160	----
D (mm)	----	----	----	----	----	55	65	80	----
Weight (Kg)	----	----	----	----	----	0,93	1,94	3,85	----

Anchor plate

Reference	MB12P008	MB16P009	MB20P010	MB25P011	MB28P012	MB32P013	MB40P014	MB50P015	MB63P016
L (mm)	50	50	70	90	100	120	150	190	245
E (mm)	8	8	10	12	12	20	30	45	50
Weight (Kg)	0,16	0,16	0,39	0,78	0,96	2,30	5,40	13,00	24

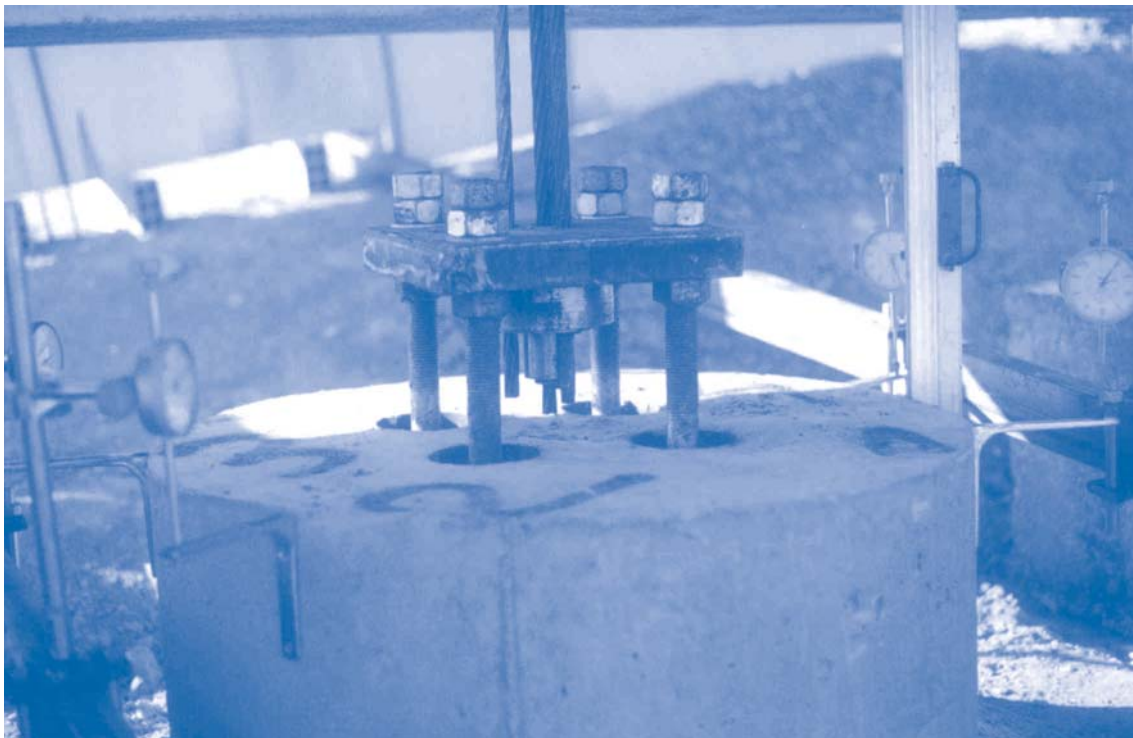
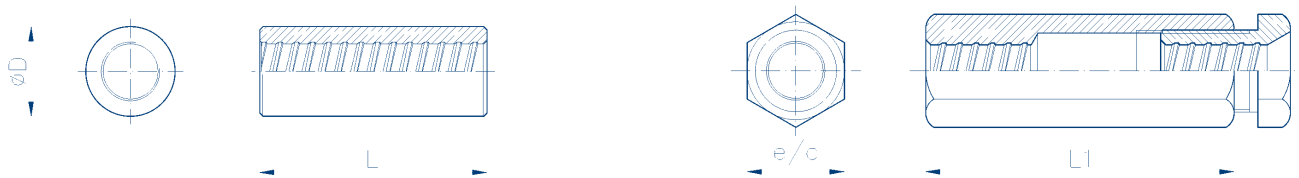
Coupler

Reference	MB12MFS	MB16MFS	MB20MFS	MB25MFS	MB28MFS	MB32MFS	MB40MFS	MB50MFS	MB63MFS
L (mm)	60	90	105	115	125	140	160	200	260
D (mm)	22	32	36	40	45	55	65	80	101,6
Weight (Kg)	0,30	0,40	0,65	0,70	1,00	1,50	2,60	4,80	10,30

Turnbuckle

Reference	MB12MTS	MB16MTS	MB20MTS	MB25MTS	MB28MTS	MB32MTS	MB40MTS	MB50MTS	MB63MTS
L1 (mm)	110	125	145	160	175	190	225	270	350
L2 (mm)	45	50	60	65	70	80	95	105	140
D (Kg)	32	36	41	46	50	60	80	100	120
Weight (Kg)	0,68	0,92	1,14	1,41	1,76	2,87	6,60	10,70	----

Note: The standard coupler incorporates a stopper.



MK S670 SYSTEM

MK S670 system uses special steel bars with diameters ranging between 18 mm and 63,5 mm. A complete set of fittings is also available.

Taking advantage from its higher tensile strength (compared to MKB 500 system) is an important economy for our customers on some projects.

The bars are obtained by hot rolling, creating the continuous thread.

BARS MK S670

Quality	Bar Diameter (mm)	Tensile Strength (N/mm ²)	Elastic limit (N/mm ²)	Elongation %	Young Modulus (kN/mm ²)	Thread
S 670 H	18-43	800	670	10%	205	RIGHT
S 680	57,5-63,5	850	680	10%	205	RIGHT

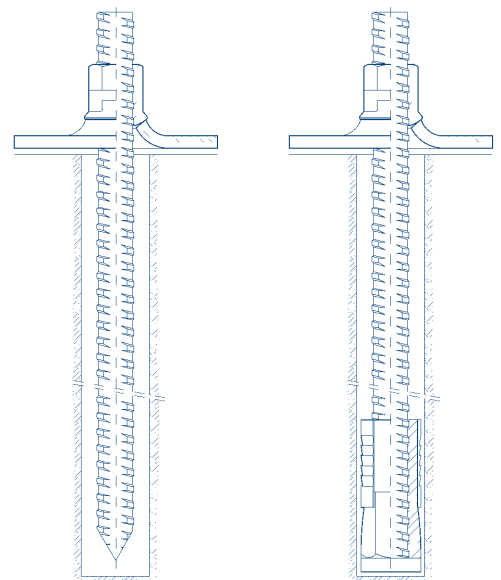
Reference (mm)	Nominal D. (mm)	Maximum D. (mm ²)	Cross Section (mm ²)	Weight (kg/m)	Pitch (mm)	Min. breaking load (kN)	Yield Strength 0,1% kN
MKS670H18	18	21	250	1,96	8	200	170
MKS670H22	22	25	375	2,94	8	300	250
MKS670H25	25	28	491	3,85	10	390	330
MKS670H28	28	32	616	4,83	11	490	410
MKS670H30	30	34	707	5,55	11	565	475
MKS670H35	35	40	962	7,55	14	770	640
MKS670H43	43	48	1466	11,51	17	1170	980
MKS670H57	57,5	63	2597	20,38	20	2080	1740
MKS670H63	63,5	70	3167	24,38	21	2540	2120

APPLICATIONS

MK S670 bars system is normally used for:

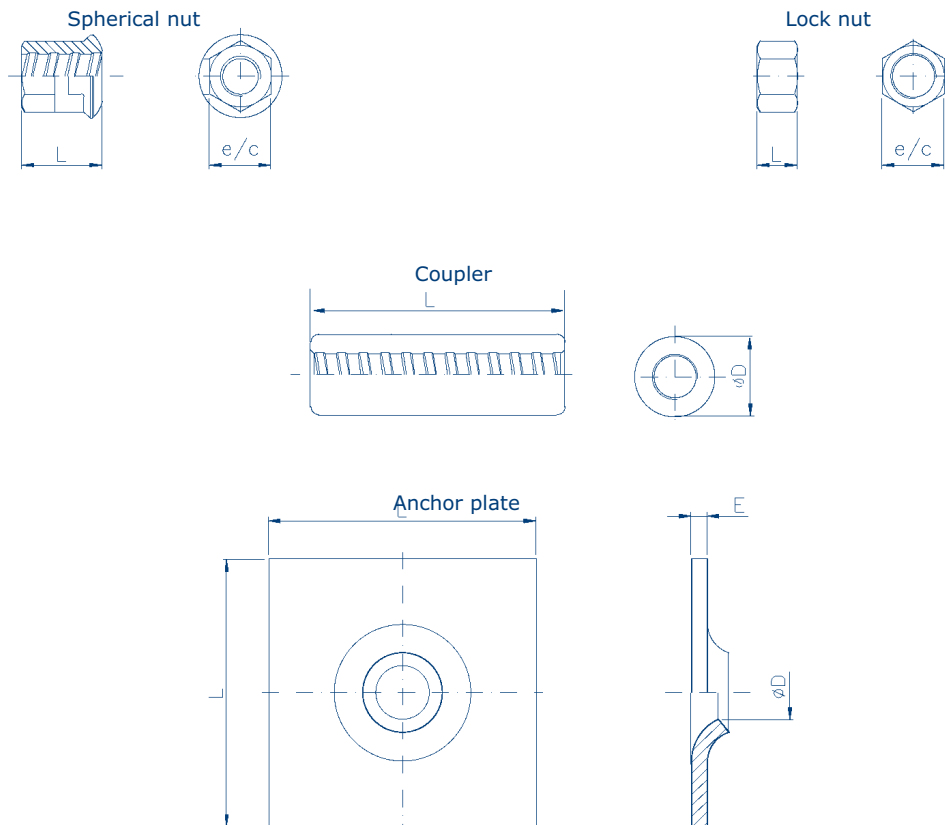
- Rock and ground anchors
- Rock nails for tunnels and mining
- Stabilization of slopes
- Piles

The MK S670 bar system offers a wide set of fittings to responde to all the needs of the engineers during the project and construction phases.



FITTINGS MK S670

Nominal D.	18	22	25	28	30	35	43	57,5	63,5
Spherical nut									
L (mm)	35	40	50	60	60	70	90	120	120
e/c (mm)	30	36	41	46	46	65	80	90	100
Weight (kg)	0,20	0,30	0,45	0,65	0,65	1,36	2,60	4,40	5,55
Lock nut									
L (mm)	22	22	22	30	30	40	50	60	70
e/c (mm)	30	36	41	41	46	55	70	90	100
Weight (kg)	0,09	0,12	0,16	0,19	0,26	0,50	1,05	2,20	3,20
Coupler									
L (mm)	100	110	120	140	150	170	200	250	260
D (mm)	36	40	45	50	55	60	80	102	108
Weight (kg)	0,58	0,70	0,98	1,40	1,85	2,35	5,50	10,00	11,50
Anchor plate for spherical nut									
L (mm)	150	150	200	200	200	150	190	245	280
E (mm)	10	10	10	12	12	30	45	50	60
D (mm)	26	34	34	40	40	47	58	70	78
Weight (kg)	1,75	1,70	3,10	3,70	3,70	4,80	11,70	21,90	33,60



MK Y1100 AND MK S1000 SYSTEMS

Bars for formwork (diameter 15mm)

MKY1100 & MK S1000 systems use special high tensile strength, low relaxation steel bars with 15 mm diameter and a wide range of fittings.

Bars are continuous threaded.

Product is normally supplied in lengths of 6 m.

Cold rolling provides the special mechanical specifications of these steel bars.

MK Y1100 bars are NON WELDABLE. When welding is required, MK4 can provide the MK S1000 bars, where WELDING IS ALLOWED.

MK Y1100 AND MK S1000 BARS

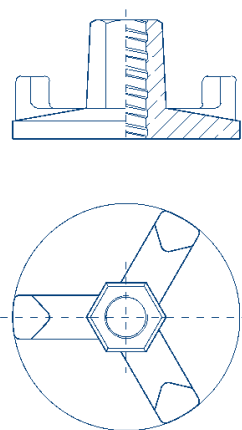
Bars	Bar D. (mm)	Tensile Strength (N/mm ²)	Elastic limit (N/mm ²)	Elongation %	Y.modulus (kN/mm ²)	Thread	Weldability	Lamination
Y1100	15	1100	900	7	205	Right	Non weldable	hot
S1000	15	1100	1000	7	205	Right	weldable	hot

Reference	Nominal D. (mm)	Maximum D. (mm)	Cross Section (mm ²)	Weight (kg/m)	Pitch (mm)	Min. breaking load kN	Yield strength f _y at 0,1% kN	Working load f _y /1,75 kN
MKY1100F15	15	17	1,76	1,44	10	190	160	90
MKS1000F15	15	17	1,76	1,41	10	190	175	100

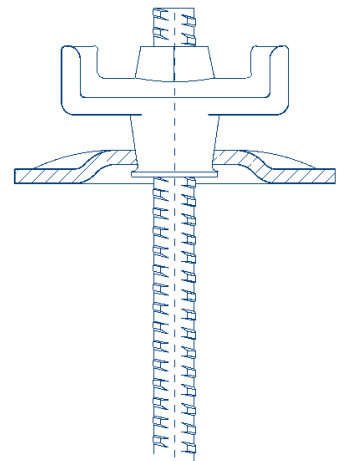
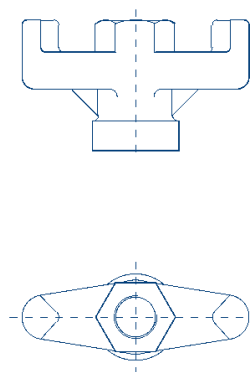
APPLICATIONS

- Fixing and connection system for standard and special concrete formwork fabrication.

Butterfly nut with plate



Butterfly nut



MK Y1100 AND MK S1000 SYSTEM

Bars for anchor system of the precast bridge barriers (diameter 20 mm)

For this special use, the MKY1100 & MKS1000 systems use special high tensile strength low relaxation bars of 20 mm and a wide range of fittings.

The bars are threaded in all of its length and supplied in a standard length of 6 m.

Cold rolling is providing the special mechanical specifications of these steel bars.

MK Y1100 bars are non NON WELDABLE. When welding is required, MK4 can provide the MK S1000 bars, where WELDING IS ALLOWED

BARS MK Y1100 AND MK S1000

	Bar D. (mm)	Tensile strength (N/mm ²)	Elastic limit (N/mm ²)	Elongation %	Young Modulus (kN/mm ²)	Thread	Weldability	Lamination
Y1100	20	1100	900	7	205	Right	Non weldable	Hot
S1000	20	1100	1000	7	205	Right	Weldable	Hot

	Nominal D. (mm)	Maximum D. (mm)	Cross Section (mm ²)	Weight (kg/m)	Pitch (mm)	Min. Breaking load kN	Yield strength f _y at 0,1% kN	Working load f _y /1,75 kN
MKY1100F20	20	23	3,14	2,56	10	345	280	160
MKS1000F20	20	23	3,14	2,51	10	345	315	180

ANCHOR SYSTEM FOR THE PRECAST SECURITY BARRIER

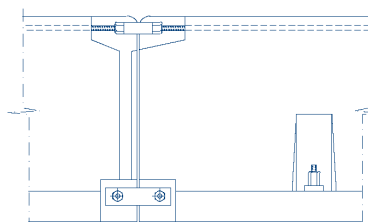
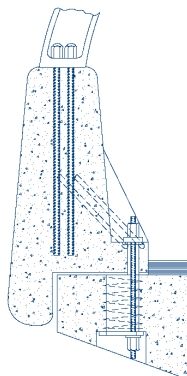
The MK4 anchor system for these bridge barriers allows the attachment to the deck of the bridge according to the standard recommendations from different countries.

This system comprises:

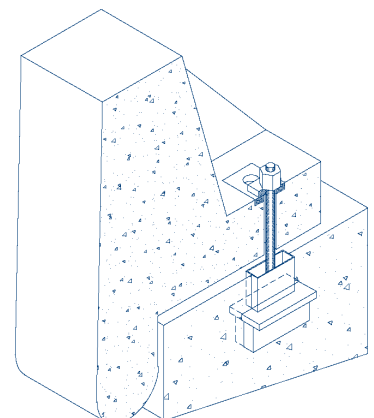
- MK Y1100 D/20 anchor bar to connect the barrier to the deck with all of its fittings.
- Embedded bolt
- Passing bolt
- MK B500 D/20 longitudinal bar to connect the precast elements (barriers)
- MK B500 D/20 bar to fix the metallic railing with its fittings.

*Note: Bar features in page 8

Anchorage for barriers. Passing Bolt



Anchorage for bridge barriers. Embedded bolt



MK4
Innovative Solutions



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