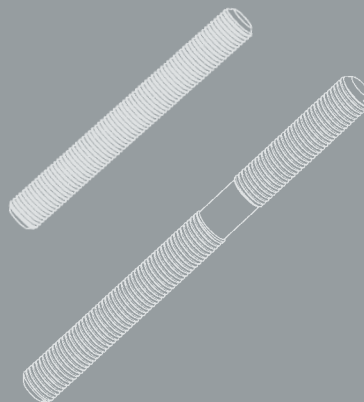
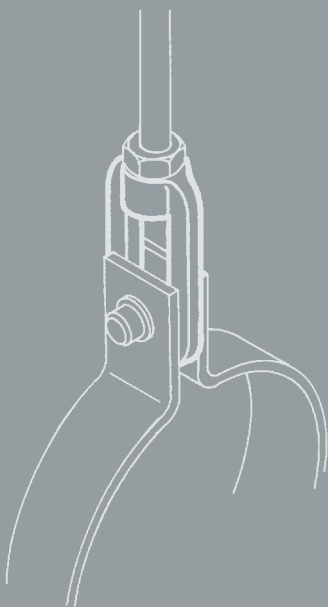
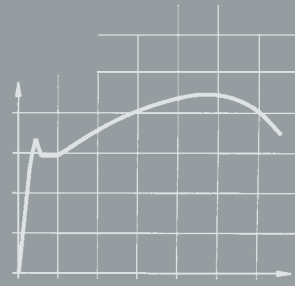


# Threaded connecting elements

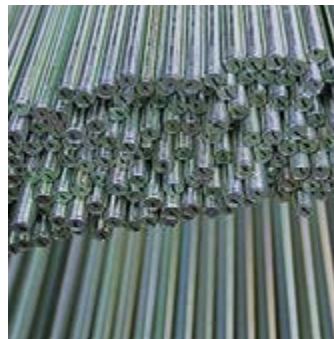
# 6

THREADED CONNECTING ELEMENTS



PRODUCT  
GROUP

6



# Connection components

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**PRODUCT  
GROUP 6**

7

8

9

# Threaded connections

## Type 60 to 64

**Precision-fit threads, reliable material properties and design with sufficient load reserves are prerequisites for the reliability of the whole load chain.**

The connections in product group 6 are specially shaped bolting components to connect the connecting rods to other support components. They connect components in the load chains with their counterparts, such as lugs, U-bolts or eye plates.

The connections in product group 6 form an independent group within the modular system and were specially designed for optimum use as pipe support components.

They are largely drop-forged and, except for turnbuckle type 62, so designed that they enable a little length regulation despite low installation heights.

The permissible loads correspond to the load tables for statically determined components on page 0.6 of the technical specifications.

Eye nut type 60 is used as a transition from a rod to a bolt connection; threaded clevis with pin type 61 joins a rod to a lug connection.

Turnbuckle type 62 is fitted with a right-hand thread on one side and left-hand thread on the other. It is used in combination with tie rod type 65 for length regulation and the pre-stressing of load chains.

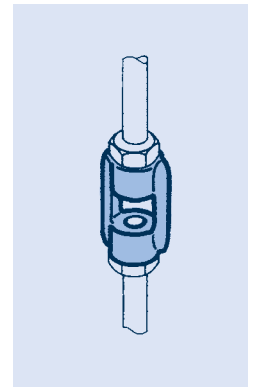
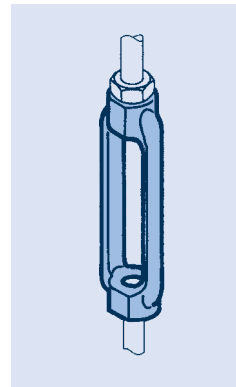
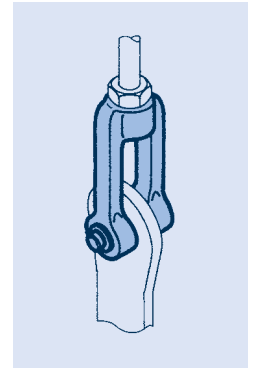
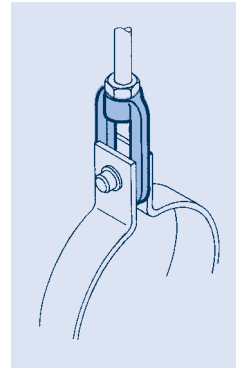
If required, rod coupling type 64 is used to form rod lengths longer than 3m.

All threads (except in turnbuckle type 62) are right-hand and available in both UNC and metric versions.

For corrosion protection the components are galvanized as standard, coating thickness approx. 12-15µm. For use in particularly aggressive atmospheres hot-dip galvanized components can be supplied.

If required, the components can be supplied with material certificates.

It is often necessary to use the connection components in areas above the standard field of application, where higher temperatures apply.



Eye nut type 60



Threaded clevis with pin type 61



Turnbuckle type 62



Rod coupling type 64

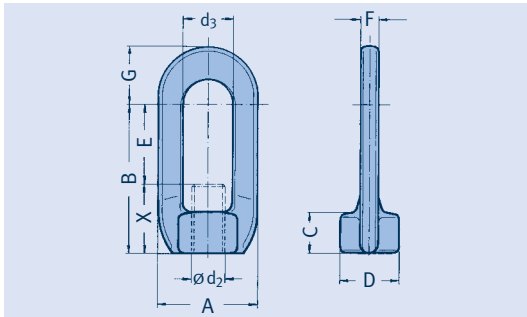
### The LISEGA connections offer special benefits:

- universal application possibilities
- load and connection compatibility with the LISEGA modular system
- drop-forged and heat-treated
- galvanized as standard, hot-dip galvanized if required
- approval through special type tests

For this, LISEGA SE offers products made from the material 10CrMo9-10. The upper load limits for use up to 500°C corresponds to the nominal load of the respective load groups. The type numbers are described as follows:

Eye nuts	: 60 .9 04-HT;
	(60 D9 04-HT to 60 99 04-HT)
Threaded clevises with pin	: 61 .9 04-HT;
	(61 D9 04-HT to 61 99 04-HT)
Turnbuckles	: 62 .9 04-HT;
	(62 D9 04-HT to 62 99 04-HT)
Rod couplings:	64 .9 04-HT;
	(64 D9 04-HT to 64 99 04-HT)

# Eye nuts Type 60 Threaded clevises with pin Type 61



## Eye nuts type 60 D9 19 to 60 50 12

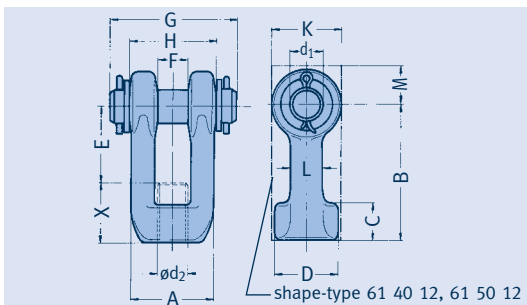
Material: P250GH  
drop-forged.

From load group 40  
welded design  
material: S355J2.

type	A	B	C	D	ød <sub>2</sub>	d <sub>3</sub>	E	F	G	X	weight [kg]
60 D9 19	24	40	11	17	M10	13	25	5	15	15	0.05
60 29 12	33	60	15	24	M12	17	40	6	19	20	0.10
60 39 12	44	75	20	30	M16	25	45	10	26	30	0.20
60 49 12	59	90	25	35	M20	29	55	10	35	35	0.40
60 59 12	72	110	30	44	M24	35	65	15	44	45	0.80
60 69 12	88	127	37	50	M30	42	75	17	54	52	1.20
60 79 12	100	140	45	60	M36	47	75	20	62	65	2.00
60 89 12	110	157	52	70	M42	52	85	25	72	72	2.90
60 99 12	120	180	60	80	M48	62	85	30	78	95	4.70
60 10 12	135	200	65	95	M56x4	62	105	40	80	95	7.70
60 20 12	150	230	70	105	M64x4	72	130	40	85	100	8.80
60 30 12	160	230	70	110	M68x4	72	130	40	90	100	9.30
60 40 12	220	250	120	125	M72x4	82	100	50	110	150	27.00
60 50 12	250	280	140	140	M80x4	92	120	60	125	160	45.00

## Order details:

eye nuts  
type 60..1.



## Threaded clevises with pin type 61 D9 19 to 61 50 12

Material: P250GH

From load group 10 and  
further material: S355J2,  
drop-forged.

From load group 40 and  
further flame-cut design  
material: S355J2.

type	A	B	C	D	ød <sub>1</sub>	ød <sub>2</sub>	E	F	G	H	K	L	M	X	weight [kg]
61 D9 19	23	50	11	17	10	M10	35	11	50	25	21	5x9	-	15	0.1
61 29 12	33	70	15	25	12	M12	50	12	60	34	24	8x12	-	20	0.2
61 39 12	42	80	20	33	16	M16	50	17	70	44	32	11x15	-	30	0.4
61 49 12	55	90	25	40	20	M20	55	20	90	57	46	16x21	-	35	1.0
61 59 12	65	110	30	46	24	M24	65	22	105	68	53	19x25	-	45	1.6
61 69 12	72	130	35	51	33	M30	80	27	125	80	64	19x29	-	50	2.7
61 79 12	85	150	40	61	40	M36	90	32	140	93	80	22x36	-	60	4.4
61 89 12	100	170	50	72	45	M42	100	37	165	110	90	27x40	-	70	7.2
61 99 12	120	180	60	83	50	M48	95	42	185	130	100	33x44	-	85	10.4
61 10 12	130	215	65	90	60	M56x4	120	50	210	150	120	30x45	-	95	14.8
61 20 12	155	230	70	110	70	M64x4	130	60	245	175	150	35x55	-	100	24.4
61 30 12	155	230	70	110	70	M68x4	125	60	245	175	150	35x55	-	105	24.4
61 40 12	150	240	80	-	80	M72x4	130	56	230	150	150	-	90	110	42.0
61 50 12	165	260	90	-	90	M80x4	140	64	240	165	180	-	110	120	60.0

## Bolts

C35E+QT complete with  
split pins DIN EN ISO 1234  
and washers DIN 1441.

From load group 40 and  
further material: S355J2.

## Order details:

threaded clevises with pin  
type 61..1.

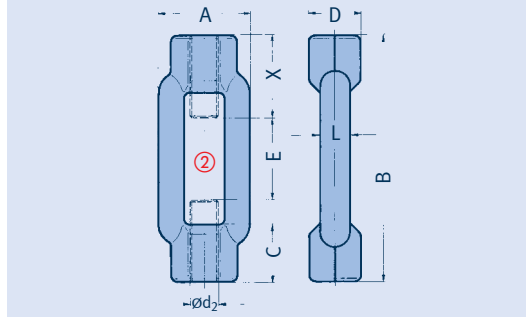
# Turnbuckles Type 62

## Rod couplings Type 64

### Turnbuckles type 62 D9 19 to 62 50 15

Material: S235JR  
drop-forged.

From load group 10  
flame-cut design  
material: S355J2.



① One side right-hand,  
other side left-hand thread.

② The ends of the threaded rods  
must not come into contact.

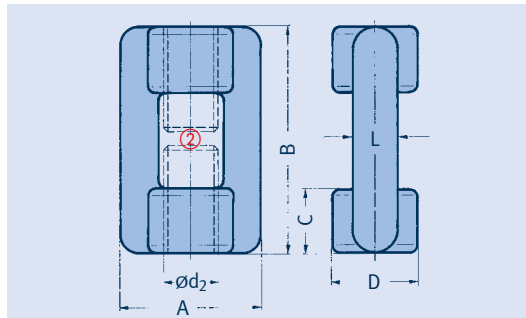
type	A	B	C	SW	$\varnothing d_2$ ①	E	L	X	weight [kg]
62 D9 19	30	125	18	16	M10	35	9x 8	45	0.15
62 29 12	34	125	21	18	M12	35	11x 9	45	0.20
62 39 19	42	150	27	24	M16	50	14x11	50	0.40
62 49 19	52	170	33	30	M20	60	17x14	55	0.70
62 59 19	62	240	39	36	M24	80	22x17	80	1.20
62 69 12	74	255	45	46	M30	85	23x20	85	1.80
62 79 12	86	295	55	55	M36	95	28x23	100	3.00
62 89 12	104	330	63	65	M42	100	32x27	115	4.80
62 99 12	130	355	75	75	M48	105	40x35	125	7.80
62 10 15	110	300	60	80	M56x4	80	80x23	110	10.00
62 20 15	130	320	70	90	M64x4	80	90x28	120	15.00
62 30 15	140	330	75	100	M68x4	80	100x30	125	18.00
62 40 15	150	390	80	100	M72x4	90	100x33	150	22.00
62 50 15	165	410	90	120	M80x4	90	120x37	160	32.00

**Order details:**  
turnbuckle  
type 62..1.

### Rod coupling type 64 D9 19 to 64 50 15

Material: S235JR  
drop-forged.

From load group 10  
flame-cut design  
material: S355J2.



type	A	B	C	D	$\varnothing d_2$	L	weight [kg]
64 D9 19	34	45	15	21	M10	11x 9	0.1
64 29 18	34	45	15	21	M12	11x 9	0.1
64 39 18	42	60	20	27	M16	14x11	0.2
64 49 18	52	75	25	32	M20	17x14	0.5
64 59 18	62	90	30	39	M24	22x17	0.7
64 69 18	74	105	35	45	M30	23x20	1.2
64 79 18	86	120	40	55	M36	28x23	1.6
64 89 18	104	150	50	63	M42	32x27	2.6
64 99 18	130	180	60	75	M48	40x35	5.1
64 10 15	110	190	60	80	M56x4	80x23	7.0
64 20 15	130	220	70	90	M64x4	90x28	11.0
64 30 15	140	240	75	100	M68x4	100x30	14.0
64 40 15	150	250	80	100	M72x4	100x33	15.0
64 50 15	165	280	90	120	M80x4	120x37	23.0

**Order details:**  
rod coupling  
type 64 .. 1.

# Connecting rods

## Type 63, 65, 66, 67

### Application

Threaded and tie rods connect the support components to each other in order to bridge installation heights. They can be used as rigid supports with the connection components and in elastic load chains with spring and constant hangers.

### Materials and loads

Only materials with guaranteed mechanical properties regarding good homogeneity and sufficient charpy-test values (ductility) are used. The permissible loads correspond to the load table for statically determined components in the technical specifications on page 0.6.

### Rolled threads

All threads are manufactured in a rolling process. By rolling the threads are not cut. Through the rolling process the material is made to flow and is plastically formed. In this way the surface is given additional notch-free high-quality strength.

Friction resistance is thereby reduced; this has a favorable effect on any adjustment of the rods under load. On top of that, safety reserves exceeding the demands of the design specifications are created.

### Designs

Threaded rods type 67 with continuous threading up to M48 and tie rods type 66 (from M20) are available in fixed 500mm length increments in the length range from 500mm up to 3,000mm. The tie rods have thread lengths of 300mm on one side and 600mm on the other. The short thread is for length adjustment, e.g. as a connection for spring and constant hangers. The long thread is for the fitted length. This can be shortened as required according to the installation height on site.

### Standard lengths

Larger tolerances in the building structure have led to increasing problems with fitted lengths instead of easier installation, especially when the connection threads are too short. The use of standardized fixed lengths is therefore more and more common because of their greater flexibility. Fitting can be easily carried out with hanging rods already mounted at the upper end.

Laborious measurement with the risk of error is thereby avoided. Structural tolerances can be balanced to advantage.

### Length adjustment

Tie rods type 65 with right-hand / left-hand threads are always used in combination with turnbuckle type 62 and fitted with standard lengths. They are designed for length adjustment and force-fit prestressing of load chains.

All other bolted connections are exclusively right-hand threads and on installation must be countered with a hexagon nut type 63.

### Corrosion protection

For corrosion protection all rod types are galvanized, layer thickness approx. 12-15µm. If required, hot-dip galvanization is available.

Hot dip galvanized threaded rods M10/M12 are available in lengths up to 1,000mm. Extensions are made by way of rod couplings.

### Certification

If so ordered, all components can be supplied with certificates according to DIN EN 10204-2.2 or 3.1.

### Special properties:

- materials with proven characteristics
- rolled threads
- notch-free surfaces
- galvanized surfaces
- standard lengths
- in-house manufacture

Often there is a need to use the connecting members even in areas which are above the standard range of application and can be exposed to higher temperatures. For this LISEGA SE offers products made from the material 21CrMoV57 or 25CrMo4 for hex nuts. The load limits for use up to 500°C correspond to the nominal load of each load group.

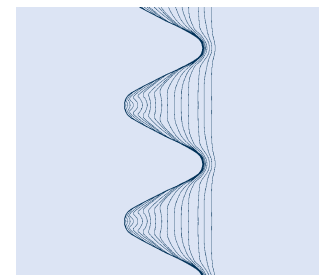
The type numbers are described as follows:

Tie rod	:	65 .1 03-HT; (65 D1 03-HT to 65 91 03-HT)
Stud bolt	:	67 .1 03-HT; (67 D1 03-HT to 67 91 03-HT)
Threaded rod	:	67 .. 03-HT; (67 D2 03-HT to 67 95 03-HT)
Tie rod	:	66 .. 03-HT; (66 46 03 to 66 97-HT-03 HT)
Hexagon nut	:	63 .9 3. ; (63 D9 39 and 63 19 38 to 63 99 38)

The pipe systems are embedded in load chains, where the connecting rods are important elements. When selecting them great attention must be paid to quality so that these seemingly simple components do not form the weakest link in the chain. The decisive factors for their load-bearing capacity are, beside adequate dimensioning, material quality and design conforming to standards.



Manufacture of threaded components



Fiber flow of rolled thread

# Tie rods LR Type 65

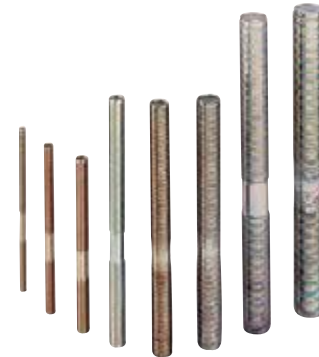
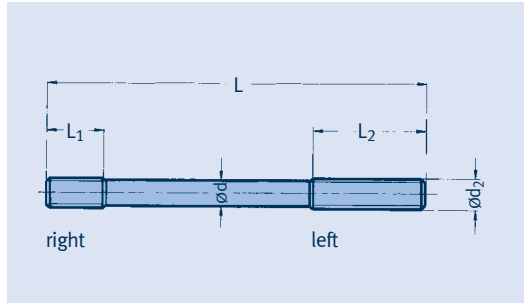
## Stud bolts Type 67

## Hexagon nuts Type 63

### Tie rods left-hand/right-hand type 65 D1 19 to 65 50 13

Material:  
M10 to M16: S235JR  
from M20: S355J2.

**LISEGA threaded rods should only be replaced in kind.**



type	ø d	ø d <sub>2</sub>	L	L <sub>1</sub> right	L <sub>2</sub> left	weight [kg]
65 D1 19	8.75	M10	250	80	130	0.1
65 21 13	10.74	M12	250	80	130	0.2
65 31 13	14.54	M16	250	80	130	0.3
65 41 13	18.20	M20	250	80	130	0.5
65 51 13	21.85	M24	350	120	190	1.0
65 61 13	27.55	M30	350	120	190	1.6
65 71 13	33.15	M36	350	120	190	2.4
65 81 13	38.91	M42	450	160	220	4.2
65 91 13	44.53	M48	450	160	220	5.5
65 10 13	53.22	M56x4	550	200	270	9.6
65 20 13	61.20	M64x4	550	200	270	12.7
65 30 13	65.20	M68x4	550	200	270	14.4
65 40 13	69.20	M72x4	600	220	300	17.7
65 50 13	77.20	M80x4	600	220	300	22.1

**Order details:**  
tie rod LR  
type 65..1.

### Hexagon nuts type 63 D9 29 to 63 50 28

Material: grade 8 hexagon nuts DIN EN ISO 4032 as counter nuts for threaded rods M10 – M80x4.



type	size	weight [kg]
63 D9 29	M10	0.01
63 29 28	M12	0.02
63 39 28	M16	0.03
63 49 28	M20	0.06
63 59 28	M24	0.11
63 69 28	M30	0.22
63 79 28	M36	0.39
63 89 28	M42	0.65
63 99 28	M48	0.98
63 10 28	M56x4	1.40
63 20 28	M64x4	1.90
63 30 28	M68x4	2.25
63 40 28	M72x4	2.60
63 50 28	M80x4	3.40

**Order details:**  
hexagon nut  
type 63..2.

### Stud bolts type 67 D1 19 to 67 91 13

Material:  
M10 to M16: S235JR  
from M20: S355J2.

**LISEGA threaded rods should only be replaced in kind.**

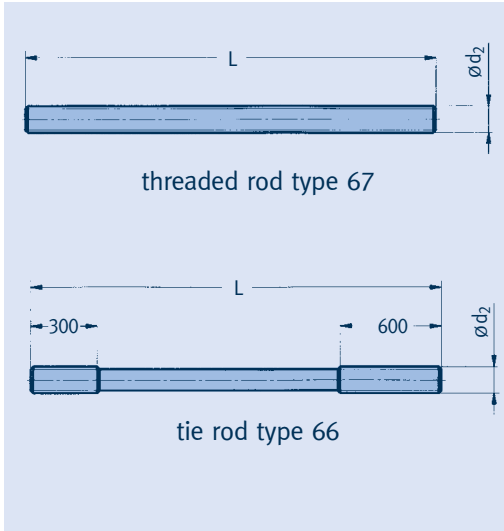


type	L	ø d <sub>2</sub>	weight [kg]
67 D1 19	30	M10	0.02
67 21 13	35	M12	0.03
67 31 13	50	M16	0.07
67 41 13	60	M20	0.12
67 51 13	75	M24	0.22
67 61 13	90	M30	0.42
67 71 13	110	M36	0.75
67 81 13	125	M42	1.17
67 91 13	145	M48	1.77

**Order details:**  
stud bolts  
type 67..1.



## Tie rods Type 66 Threaded rods Type 67



Threaded rods / tie rods  
type 67 D2 19 to 67 50 13 /  
type 66 46 13 to 66 50 13

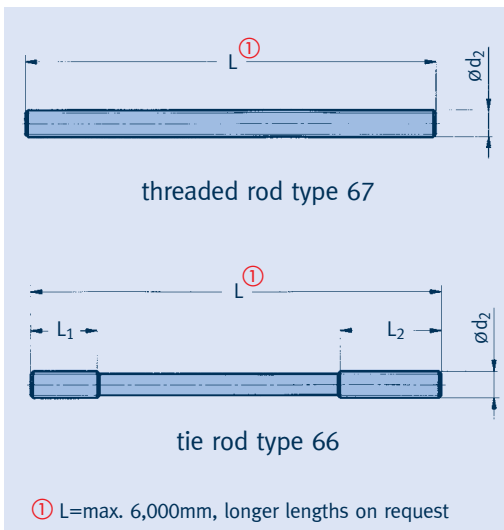
Material:  
M10 to M16: S235JR  
from M20: S355J2.

**LISEGA threaded rods  
should only be replaced  
in kind.**

$\varnothing d_2$	type designation at L=						weight [kg/m]
	500	1000	1500	2000	2500	3000	
M 10	67 D2 19	67 D3 19	67 D4 19	67 D5 19	67 D6 19	67 D7 19	0.5
M 12	67 22 13	67 23 13	67 24 13	67 25 13	67 26 13	67 27 13	0.7
M 16	67 32 13	67 33 13	67 34 13	67 35 13	67 36 13	67 37 13	1.3
M 20	67 42 13	67 43 13	67 44 13	67 45 13	66 46 13	66 47 13	2.0
M 24	67 52 13	67 53 13	67 54 13	67 55 13	66 56 13	66 57 13	2.9
M 30	67 62 13	67 63 13	67 64 13	67 65 13	66 66 13	66 67 13	4.7
M 36	67 72 13	67 73 13	67 74 13	67 75 13	66 76 13	66 77 13	6.8
M 42	67 82 13	67 83 13	67 84 13	67 85 13	66 86 13	66 87 13	9.3
M 48	67 92 13	67 93 13	67 94 13	67 95 13	66 96 13	66 97 13	12.2

**Standard lengths avoid  
problems caused when  
installation lengths are  
too short. They can be  
flexibly adapted by short-  
ening to suit the installa-  
tion situation on site.**

**Order details:**  
threaded rod / tie rod  
type 6. ...



Connecting rods from  
M56x4 can be supplied as  
threaded rods type 67 or  
as tie rods type 66 with  
individual rolled thread  
lengths.

$\varnothing d_2$	type designation (L / L <sub>1</sub> / L <sub>2</sub> please note at order)		weight [kg/m]
M 56x4	66 10 13	67 10 13	17.5
M 64x4	66 20 13	67 20 13	23.1
M 68x4	66 30 13	67 30 13	26.2
M 72x4	66 40 13	67 40 13	29.5
M 80x4	66 50 13	67 50 13	36.8

**Order details:**  
**from M56x4:**  
threaded rod / tie rod  
type 6. ...  
L = ...mm  
L<sub>1</sub> = ...mm  
L<sub>2</sub> = ...mm