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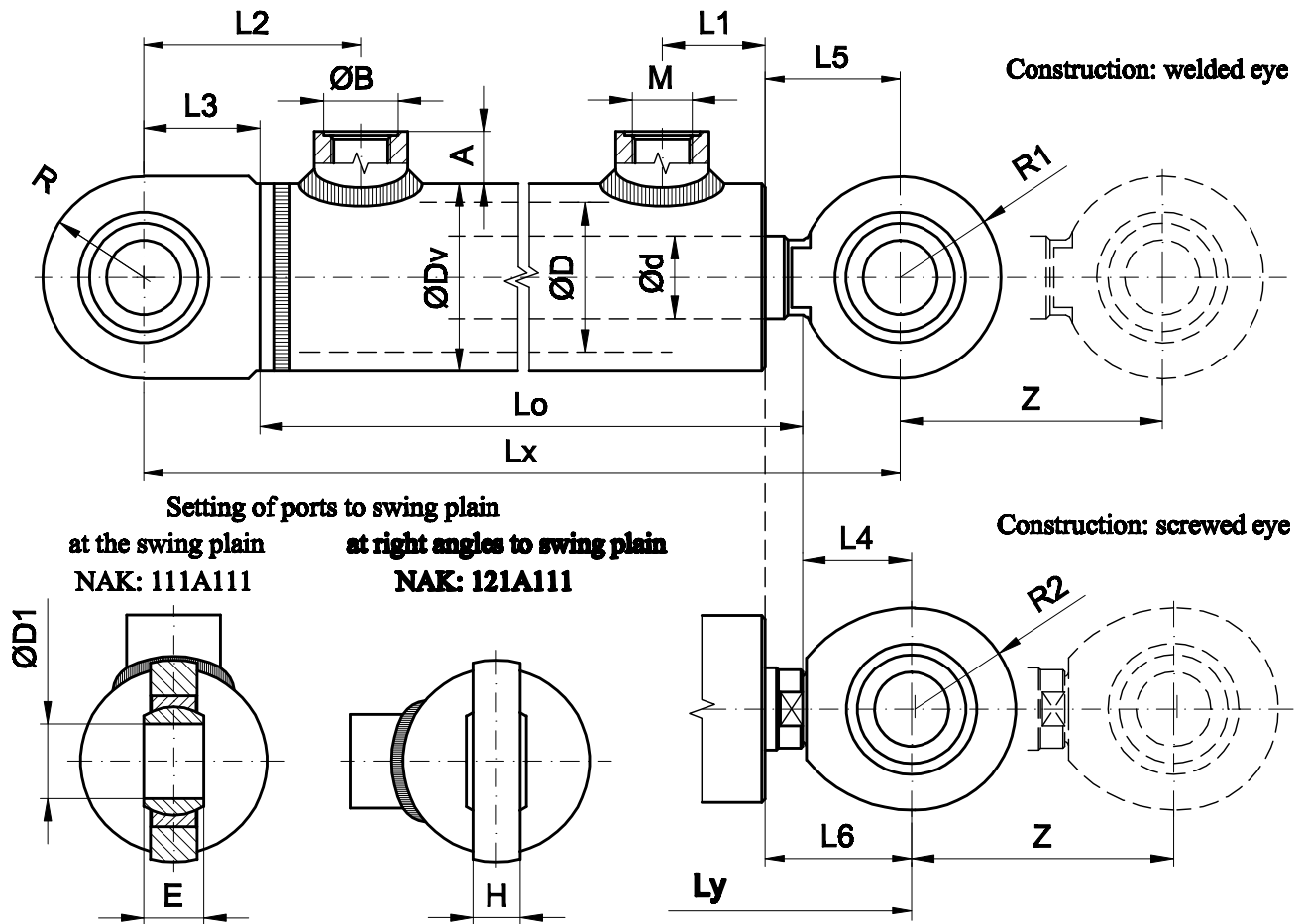
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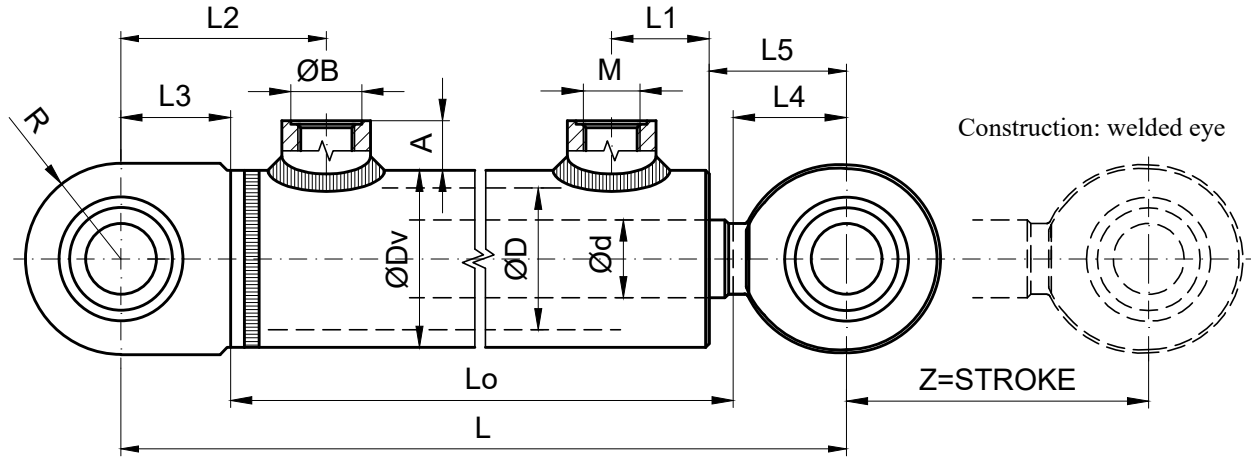
Dimensions (mm)																						
ØD	Ød	ØDv	Lx	Ly	Lo	L1	L2	L3	L4	L5	L6	H	E	ØD1	M	ØB	A	R	R1	R2		
32	18	20	22	42	155+Z	-	99+Z	33	44	27	-	40	-	13	16	20	14x1.5	18	12	27	27	-
40	22	25	28	50	152+Z	155+Z	95+Z	27.5	58	31	29	36	39	13	16	20	16x1.5	20	14	27	27	27
50	25	28	32	62	177+Z	185+Z	112+Z	40	67.5	36	37	39	47	17	20	25	22x1.5	27	18	32.5	32.5	31
63	32	36	40	75	185+Z	190+Z	112+Z	42	69	38	40	46	51	17	20	25	22x1.5	27	18	35	35	35
70	36	40	45	85	203+Z	211+Z	124+Z	42	80	42	45	50	58	19	22	30	22x1.5	27	18	40.5	40.5	40.5
80	40	45	50	95	205+Z	215+Z	128+Z	46	77	42	45	47	57	19	22	30	22x1.5	27	19	40.5	40.5	40.5
90	45	50	55	105	267+Z	267+Z	158+Z	49	84	51	58	73	73	24	25	35	27x2	32	19	47	47	47
100	50	55	63	115	286+Z	286+Z	161+Z	50	79	57	68	83	83	25	28	40	27x2	32	19	51	51	51.5
110	55	63	70	130	312+Z	312+Z	181+Z	58	93	60	71	88	88	28	32	45	33x2	39	22	56	56	60
125	63	70	80	145	335+Z	335+Z	190+Z	65	98	65	80	102	102	32	35	50	33x2	39	22	61	61	61
140	70	80	90	160	381+Z	381+Z	211+Z	85	113	80	90	110	110	38	44	60	33x2	39	22	72.5	80	72.5

thick pressed numbers are basic diameters of piston rod (for them valid the weight)

TECHNICAL DATA

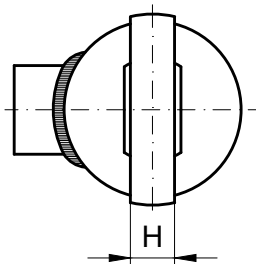
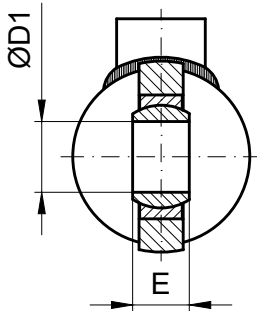
- Nominal pressure: 16 MPa
- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: priority according recommended strokes table (page 19) or according customers request (strokes more as recommended need consult - maximal up to about 2000 mm)
- Seals: Merkel, Busak+Shamban
- Cushion: without
- Construction: see the table with NAK (page 11) or according customers request
- Application: general industry, automotive industry, agricultural machinery

THE HYDRAULIC CYLINDER HM1.3 IS DIMENSIONALLY AND FUNCTIONALLY COMPATIBLE WITH TYPE HM1.2, AND COMPLETELY REPLACES THE VERSION WITH A WELDED EYE.

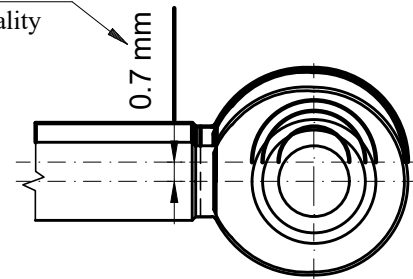


Construction: welded eye

Setting of ports to swing plain  
 at the swing plain      at right angles to swing plain  
 NAK: 111A111              NAK: 121A111



Maximum deviation tolerance after  
 friction welding to coaxiality

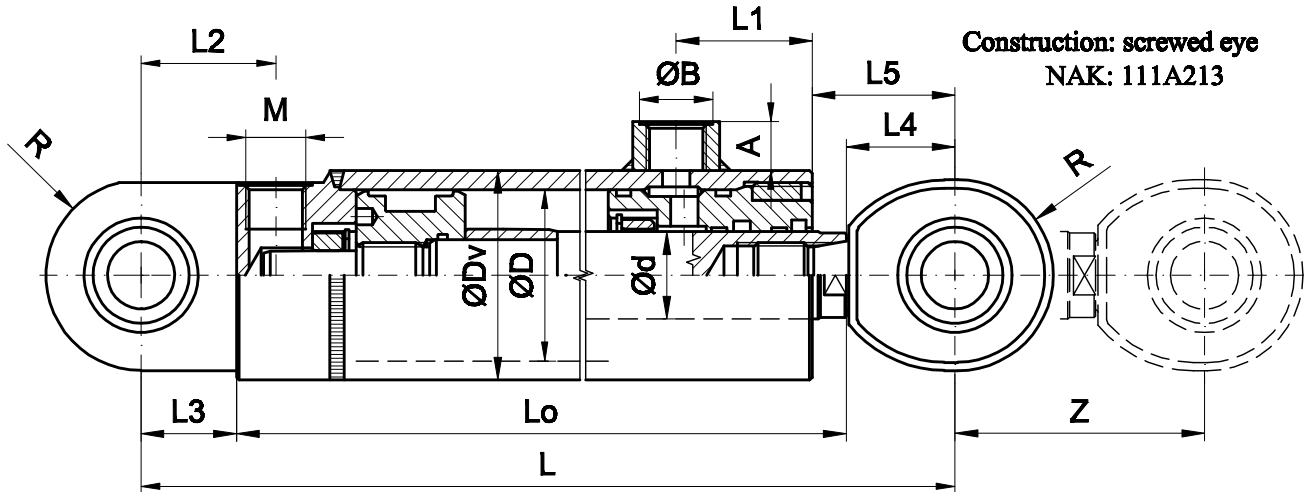


Dimensions (mm)																		Weight
ØD	Ød	ØDv	L	L0	L1	L2	L3	L4	L5	H	E	ØD1	M	ØB	A	C	R	m (kg)
40	22	50	152+Z	95+Z	25.5	58	31	26	40	13	16	20	16x1.5	22	14	53	27	1.6+0.0085xZ
50	25	62	177+Z	112+Z	33	67.5	36	29	48	17	20	25	22x1.5	27	18	64	32.5	3.36+0.012xZ
63	32	77	185+Z	112+Z	37	69	38	35	52	17	20	25	22x1.5	27	18	64	35	4.11+0.018xZ
80	40	96	205+Z	128+Z	41	77	42	35	52	19	22	30	22x1.5	32	19	73	40.5	7.1+0.026xZ

TECHNICAL DATA

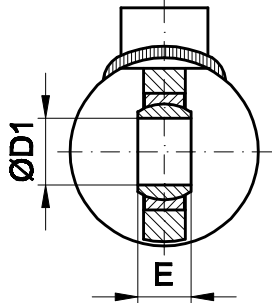
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- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: priority according recommended strokes table (page 19) or according customers request (strokes more as recommended need consult - maximal up to about 2000 mm)
- Seals: Merkel, Busak+Shamban
- Cushion: without
- Construction: see the table with NAK (page 11) or according customers request
- Application: general industry, automotive industry, agricultural machinery

The manufacturer has the exclusive right to make changes to the design without affecting the functionality and installation dimensions of the hydraulic cylinder.

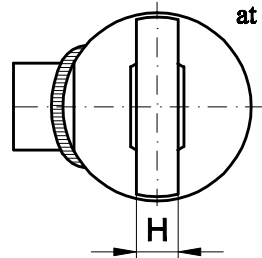


Setting of ports to swing plain

at the swing plain  
NAK: 111A213



at right angles to swing plain  
NAK: 121A213



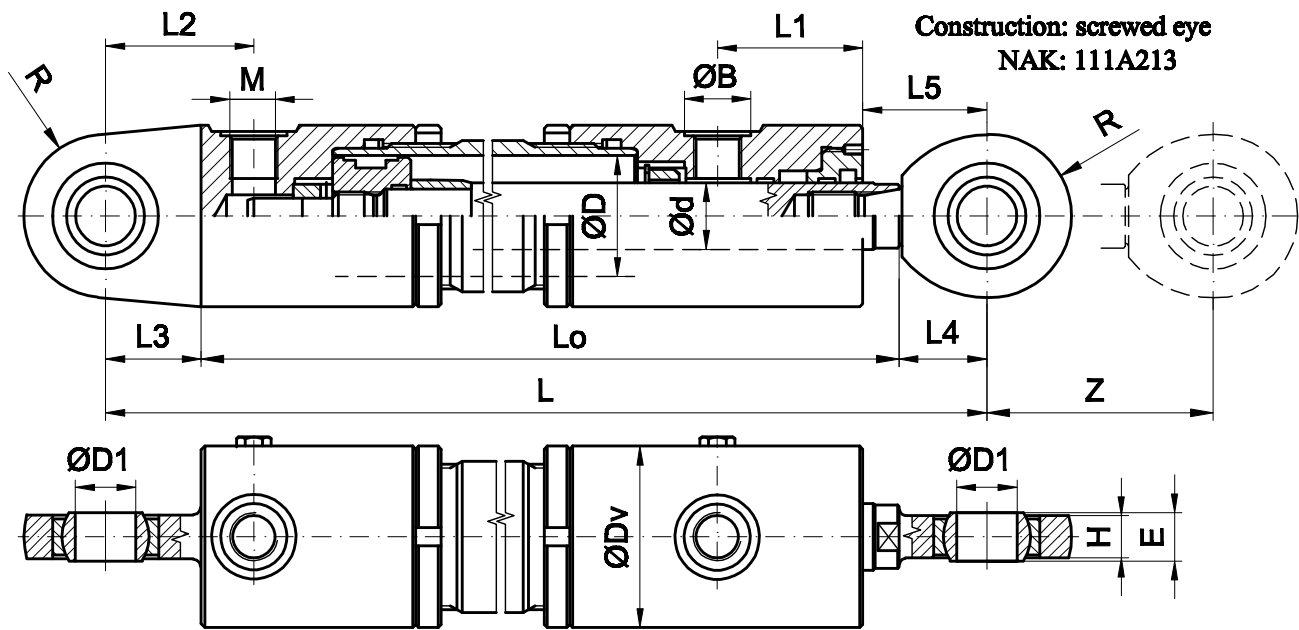
L6 - cushion lenght

Dimensions (mm)																Weight				
ØD	Ød	ØDv	L	Lo	L1	L2	L3	L4	L5	L6	H	E	ØD1	M	ØB	A	R	m (kg)		
40	22	25	-	50	200+Z	143+Z	40	40	28	29	41	22	13	16	20	16x1.5	20	14	27	3.2+0.0085xZ
50	25	28	-	62	226+Z	158+Z	45	46	31	37	52	22	17	20	25	22x1.5	27	18	31	4.45+0.012xZ
63	32	36	-	75	246.5+Z	171.5+Z	50	50	35	40	52.5	25	17	20	25	22x1.5	27	18	35	6.34+0.018xZ
70	36	40	-	85	279+Z	191+Z	52	62	43	45	58	25	19	22	30	22x1.5	27	18	43	8.21+0.023xZ
80	40	45	50	95	305+Z	217+Z	60	62	43	45	70	30	19	22	30	22x1.5	27	18	43	9.77+0.026xZ
90	45	50	55	105	321+Z	212+Z	57	71	51	58	73	30	22	25	35	22x1.5	27	18	47	13.8+0.029xZ
100	50	55	63	115	345+Z	220+Z	60	79	63	68	83	32	24	28	40	22x1.5	27	18	52	18.6+0.037xZ
110	55	63	70	125	383+Z	252+Z	70	85	72	71	88	32	27	32	45	27x2	39	22	56	22.1+0.041xZ
125	63	70	80	145	417+Z	272+Z	75	90	65	80	102	32	30	35	50	33x2	39	22	61	31.1+0.063xZ
140	70	80	90	160	457+Z	287+Z	85	105	80	90	110	35	38	44	60	33x2	39	22	72.5	45.2+0.065xZ

⚡ thick pressed numbers are basic diameters of piston rod (for them valid the weight)

**TECHNICAL DATA**

- Nominal pressure: 16 MPa
- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s, at the stroke end max. 0.2 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: priority according recommended strokes table (page 19) or according customers request (strokes more as recommended need consult - maximal up to about 2000 mm)
- Seals: Merkel, Busak+Shamban
- Cushion: at the both stroke end
- Construction: see the table with NAK (page 1) or according customers request
- Application: general industry, automotive industry, earthmoving industry, medium duty applications

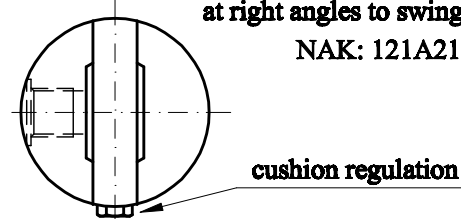
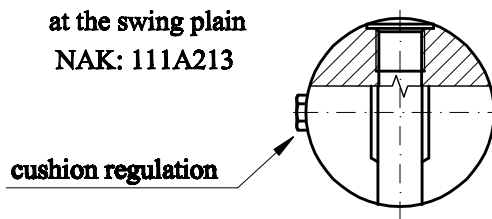


Construction: screwed eye  
NAK: 111A213

Setting of ports to swing plain

at the swing plain  
NAK: 111A213

at right angles to swing plain  
NAK: 121A213



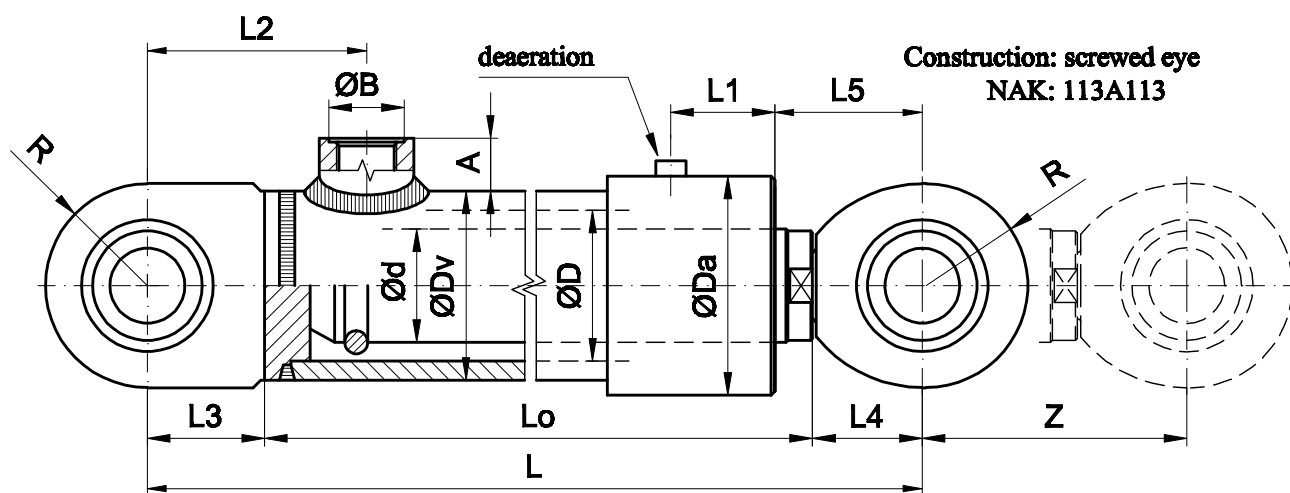
L6 - cushion length

Dimensions (mm)															Weight			
ØD	Ød	ØDv	L	Lo	L1	L2	L3	L4	L5	L6	H	E	ØD1	M	ØB	R	m (kg)	
32	18	-	48	185+Z	131+Z	36.5	35	24	29	42	18	13	16	20	14x1.5	20	27	2.87+0.0068xZ
40	22	25	60	248+Z	188+Z	48	49	31	29	64	22	13	16	20	16x1.5	22	27	3.58+0.0085xZ
50	28	32	72	272+Z	200+Z	48	55	35	37	82	28	17	20	25	22x1.5	28	31	5.88+0.012xZ
63	36	40	88	304+Z	226+Z	48	55	38	40	94	34	17	20	25	22x1.5	28	35	6.92+0.018xZ

↑ thick pressed numbers are basic diameters of piston rod (for them valid the weight)

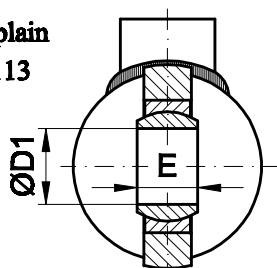
TECHNICAL DATA

- Nominal pressure: 16 MPa
- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s, at the stroke end max. 0.2 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: priority according recommended strokes table (page 19) or according customers request (strokes more as recommended need consult - maximal up to about 2000 mm)
- Seals: Merkel, Busak+Shamban
- Cushion: at the both stroke end
- Construction: see the table with NAK (page 11) or according customers request
- Application: general industry, automotive industry, earthmoving industry, medium duty applications

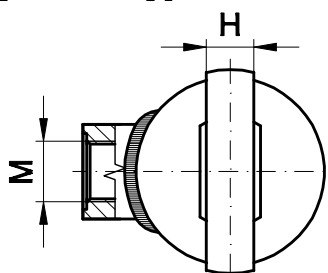


Setting of ports to swing plain

at the swing plain  
NAK: 113A113



at right angles to swing plain  
NAK: 123A113



Example for order:

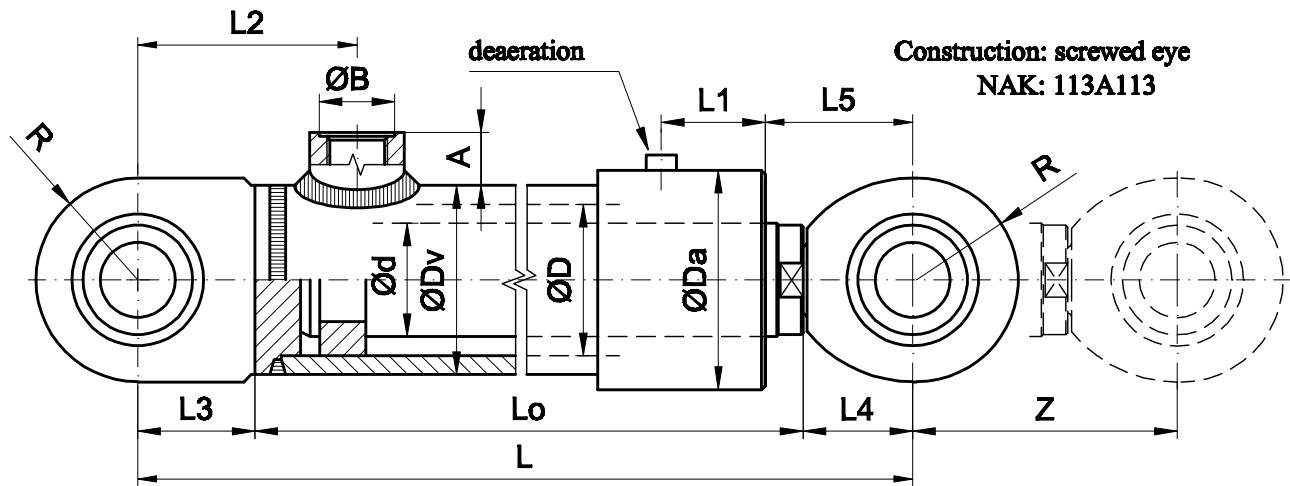
PL 63x70/320 NAK: 113A113

PL Ød x ØD/Z NAK: .. 3 . 1 ..

Dimension (mm)																			
Ød	ØD	ØDv	ØDa	L	Lo	Zmax.	L1	L2min.	L3	L4	L5	H	E	ØD1	M	ØB	A	R	
22	32	42	48	155+Z	95+Z	200	35	58	31	29	39	13	16	20	16x1.5	20	14	25	
25	32	42	48	155+Z	95+Z	250	35	58	31	29	39	13	16	20	16x1.5	20	14	25	
28	32	42	48	155+Z	95+Z	250	35	58	31	29	39	13	16	20	16x1.5	20	14	25	
32	40	50	58	155+Z	95+Z	320	35	58	31	29	39	13	16	20	16x1.5	20	14	27	
36	40	50	58	155+Z	95+Z	320	35	58	31	29	39	13	16	20	16x1.5	20	14	27	
40	50	62	74	185+Z	112+Z	400	46	68	36	37	47	17	20	25	22x1.5	27	18	31	
45	50	62	74	185+Z	112+Z	400	46	68	36	37	47	17	20	25	22x1.5	27	18	31	
50	63	75	87	190+Z	112+Z	500	47	69	38	40	51	17	20	25	22x1.5	27	18	35	
55	63	75	87	190+Z	112+Z	500	47	69	38	40	51	17	20	25	22x1.5	27	18	35	
63	70	82	96	215+Z	128+Z	630	58	72	42	45	57	19	22	30	22x1.5	27	18	40.5	
70	80	95	107	215+Z	128+Z	630	58	80	42	45	57	19	22	30	27x2	32	19	40.5	
80	90	105	118	250+Z	149+Z	800	90	69	51	50	73	22	25	35	27x2	32	19	47	
90	100	115	128	280+Z	163+Z	900	95	80	57	60	83	24	28	40	27x2	32	19	52	

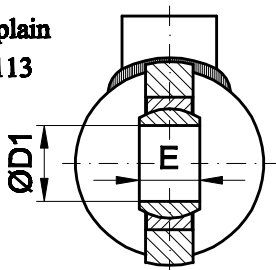
TECHNICAL DATA

- Nominal pressure: 16 MPa
- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: priority according recommended strokes table (page 19) or according customers request (maximal strokes by the table - see Zmax, for the longer stroke recommended type PLV)
- Seals: Merkel, Busak+Shamban
- Cushion: without
- Construction: see the table with NAK (page 11) or according customers request
- Application: general industry, automotive industry, agricultural machinery

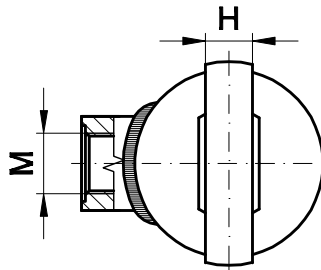


Setting of ports to swing plain

at the swing plain  
NAK: 113A113



at right angles to swing plain  
NAK: 123A113



Example for order:

PLV 63x70/320 NAK: 113A113

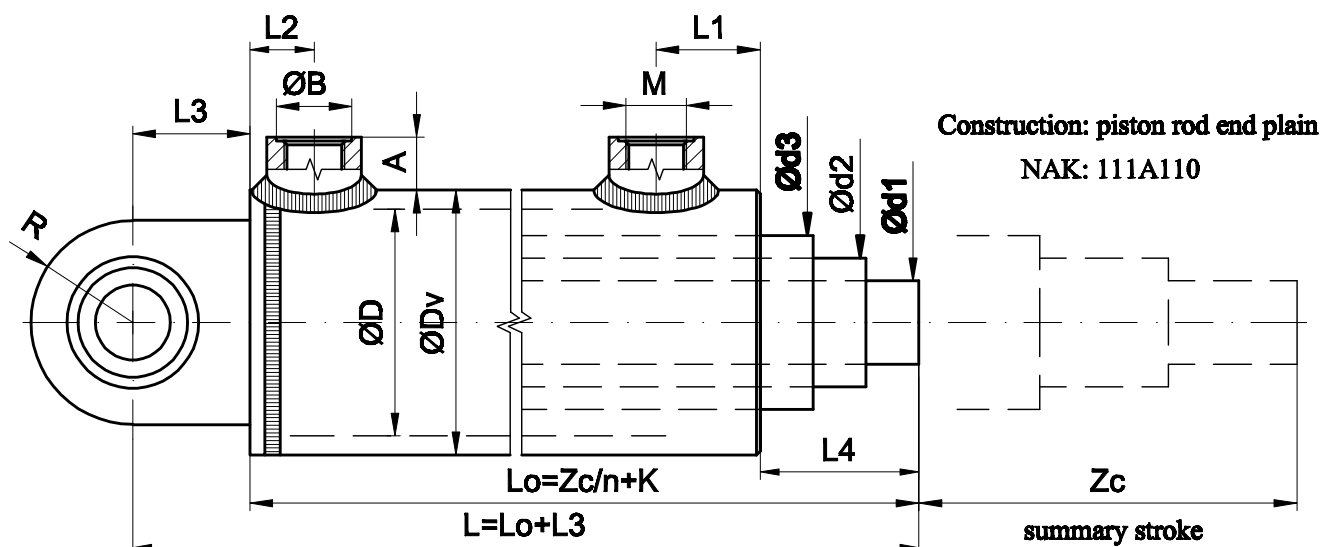
PLV Ød x ØD/Z NAK: . . 3 . 1 . .

Dimension (mm)

Ød	ØD	ØDv	ØDa	L	Lo	Zmax.dop.	L1	L2min.	L3	L4	L5	H	E	ØD1	M	ØB	A	R
22	32	42	48	155+Z	95+Z	630	35	58	31	29	39	13	16	20	16x1.5	20	14	25
25	32	42	48	155+Z	95+Z	700	35	58	31	29	39	13	16	20	16x1.5	20	14	25
28	32	42	48	155+Z	95+Z	800	35	58	31	29	39	13	16	20	16x1.5	20	14	25
32	40	50	58	155+Z	95+Z	850	35	58	31	29	39	13	16	20	16x1.5	20	14	27
36	40	50	58	155+Z	95+Z	900	35	58	31	29	39	13	16	20	16x1.5	20	14	27
40	50	62	74	185+Z	112+Z	1000	46	68	36	37	47	17	20	25	22x1.5	27	18	31
45	50	62	74	185+Z	112+Z	1200	46	68	36	37	47	17	20	25	22x1.5	27	18	31
50	63	75	87	190+Z	112+Z	1300	47	69	38	40	51	17	20	25	22x1.5	27	18	35
55	63	75	87	190+Z	112+Z	1400	47	69	38	40	51	17	20	25	22x1.5	27	18	35
63	70	82	96	215+Z	128+Z	1600	58	72	42	45	57	19	22	30	22x1.5	27	18	40.5
70	80	95	110	215+Z	128+Z	1800	58	80	42	45	57	19	22	30	27x2	32	19	40.5
80	90	105	120	250+Z	149+Z	2000	90	69	51	50	73	22	25	35	27x2	32	19	47
90	100	115	130	280+Z	163+Z	2000	95	80	57	60	83	24	28	40	27x2	32	19	52

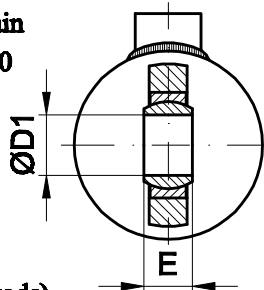
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- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: priority according recommended strokes table (page 19) or according customers request (strokes more as recommended need to consult - maximal up to about 2000 mm)
- Seals: Merkel, Busak+Shamban
- Cushion: without
- Construction: see the table with NAK (page 1) or according customers request
- Application: general industry, automotive industry, agricultural machinery

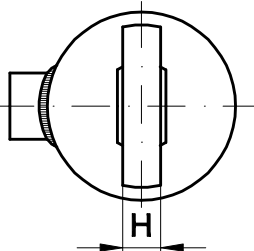


Setting of ports to swing plain

at the swing plain  
NAK: 111A110



at right angles to swing plain  
NAK: 121A110



Example for order:

TL 2 100x90x60/2000 NAK: 121A110  
TPLV 2 100x90x60/2000 NAK: 123A110

TL n Dxd2xd1/Zc NAK: ..1.1..  
TPLV n Dxd2xd1/Zc NAK: ..3.1..

Zc - summary stroke  
n - number of steps (rods)

Dimensions (mm)

n	ØD	Ød3	Ød2	Ød1	ØDv	K	L1	L2	L3	L4	H	E	ØD1	M	ØB	A	R	Typ
2	63	-	55	30	77	215	58	18	38	92	17	20	25	16x1.5	20	14	35	162
	80	-	65	35	95	220	70	14	42	83	19	22	30	16x1.5	20	14	40.5	129
	90	-	75	50	105	240	91	14	51	30	22	25	35	16x1.5	20	14	47	312c
	100	-	90	60	115	170	65	20	57	20	24	28	40	16x1.5	20	14	52	123
	110	-	100	75	125	240	86	22	60	42	27	32	45	16x1.5	20	14	56	301
	140	-	125	90	160	220	76	25	80	33	38	44	60	16x1.5	20	14	72.5	310
3	100	85	60	35	115	245	53	14	57	44	24	28	40	16x1.5	20	14	52	304
	110	100	75	50	125	300	91	14	60	43	27	32	45	16x1.5	20	14	56	312b
	150	140	105	70	170	300	91	14	80	43	38	44	60	16x1.5	20	14	72.5	312

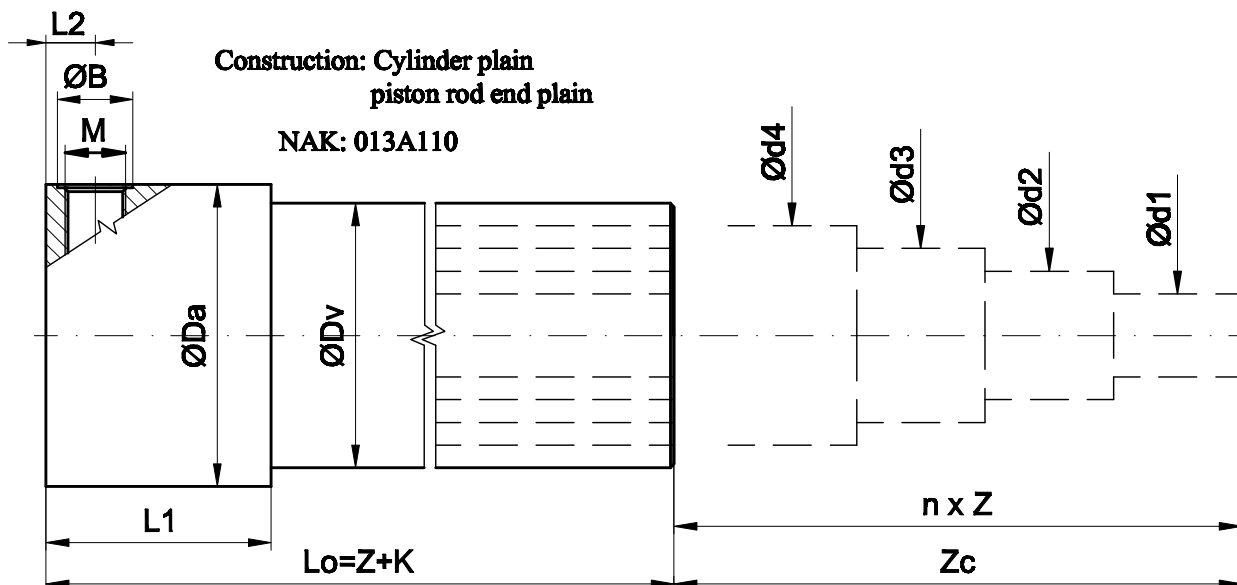
Befor order need to consult.

All types of cylinders TL we can make also as single working type TPLV with guide on the rod end, dimensions as type TL.

TECHNICAL DATA

- Nominal pressure: 16 MPa
- Max. working pressure: 20 MPa
- Testing pressure: 24 MPa
- Max. working (sliding) speed: 0.5 m/s
- Temperature range of fluid: -30 ~ +100°C
- Stroke of cylinders: according customers specification - need to consult
- Seals: Merkel, Busak+Shamban
- Cushion: without
- Construction: see the table with NAK (page 1) or according customers request
- Application: general industry, automotive industry





Z - partial stroke  
 Zc - summary stroke  
 n - number of steps (rods)

Example for order:  
 TPL 80x65x50/3x320 NAK: 113A111  
 TPL d3xd2xd1/3xZ NAK: .. 3 . 1 ..

Dimensions (mm)													
n	Ød4	Ød3	Ød2	Ød1	ØDv	ØDa	K	L1	L2	M	ØB	Z max	Zc max
2	-	-	50	36	65	77	95	90	12.5	16x1.5	20	400	800
	-	-	65	50	80	92							
	-	-	75	60	90	105							
	-	-	80	60	95	107							
	-	-	85	70	100	115							
	-	-	90	75	108	120							
3	-	65	50	36	80	92	95	90	12.5	16x1.5	20	400	1200
	-	80	65	50	95	107							
	-	90	75	60	108	120							
	-	100	80	60	120	140							
	-	100	85	70	120	140							
4	80	65	50	36	95	107	95	90	12.5	16x1.5	20	400	1600
	100	85	70	55	120	140							

Befor order need to consult.

TECHNICAL DATA

Nominal pressure: 16 MPa  
 Max. working pressure: 20 MPa  
 Testing pressure: 24 MPa  
 Max. working (sliding) speed: 0.5 m/s  
 Temperature range of fluid: -30 ~ +100°C  
 Stroke of cylinders: according customers specification - need to consult  
 Seals: Merkel, Busak+Shamban  
 Cushion: without  
 Construction: see the table with NAK (page 1) or according customers request  
 Application: general industry, automotive industry



Example of cylinder specification:

I. II. III. IV. V. VI. VII.

**(HM1.2) HRI 50x25/160**

**121A113**

Typ of cylinder

Cylinder bore ØD (mm)

Diameter of piston rod Ød (mm)

**NAK**

Stroke of cylinder Z (mm)

Sense of each positions of NAK

I. MOUNTING STYLES

- 0 Without fasten elements see page 13
- 1 Cap fixed eye spherical plain bearing see page 13
- 2 Cap fixed eye with sliding bearing see page 13
- 3 Flange (welded) see page 14
- 4 Lugs or plate see page 14
- 5 Trunnion see page 14
- 6 Hole at elongated cap see page 15
- 7 Cap with clevis see page 15
- 8 Spherical plain bearings with retaining ring see page 15
- 9 Other

II. SETTING OF PORTS

- 1 At the swing plain
- 2 At right angles to swing plain
- 3 At angle at same plain
- .
- .
- .
- .
- .
- 9 Other

III. WORKING OF CYLINDER

- 1 Single rod double working
- 2 Double rod double working
- 3 Single rod single working push cylinder
- 4 Single rod single working pull cylinder
- .
- .
- 9 Other

IV. PAINTING

- A Ground
- B Without paint
- C According specification

V. CUSHIONING

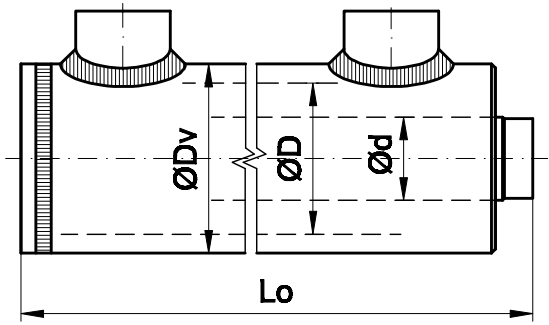
- 1 Without cushion
- 2 Cushion at both end of stroke
- 3 Cushion by the cap
- 4 Cushion by the head
- .
- .
- 9 Other

VI. TYPE OF CHROM LAYER AND TEMPERATURE RANGE

- 1 Piston rod with standard chrom layer (20 µm min.)  
Seals for standard temperature range (-30 ~ +100°C)
- 2 Piston rod with standard chrom layer (20 µm min.)  
Seals for higher temperature range (-10 ~ +200°C)
- 3 Piston rod with higher resistance (layer 20 µm min.)  
Seals for standard temperature range (-30 ~ +100°C)
- 4 Piston rod with higher resistance (layer 20 µm min.)  
Seals for higher temperature range (-10 ~ +200°C)
- 5 Cylinder for cyclic motion
- 6 Cylinder for high operating pressure
- 7 Cylinder specified for hard working conditions  
Seals - Omegat
- .
- .
- 9 Other

VII. PISTON ROD END

- 0 Plain see page 16
- 1 Welded eye with spherical plain bearing see page 16
- 2 Eye with sliding bearing see page 16
- 3 Screwed eye with spherical plain bearing see page 17
- 4 Male thread see page 17
- 5 Female thread see page 17
- 6 Hole (pin) see page 18
- 7 Clevis see page 18
- 8 Screwed eye with spherical plain bearing with retaining ring see page 18
- 9 Other

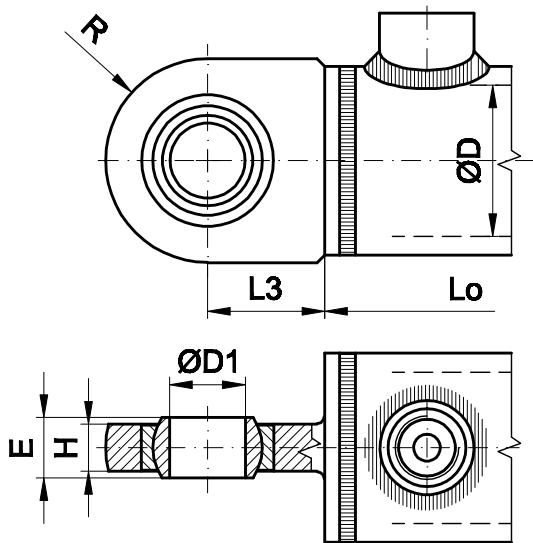


Without fasten elements

Constr. 0

See different types of cylinders

Right NAK: 0XXAXXX

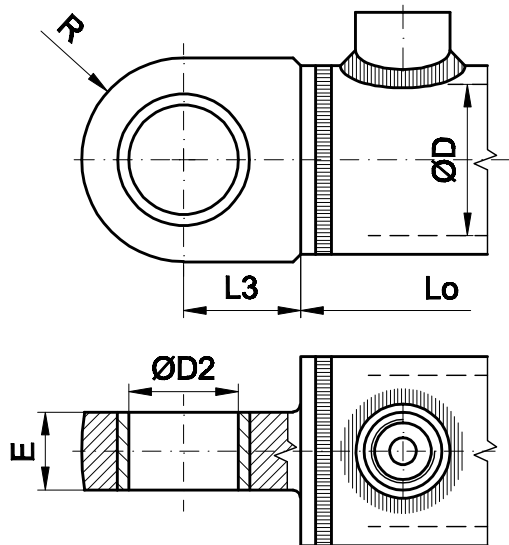


Cap fixed eye with spherical plain bearing Constr. 1

ØD1	20	25	30	35	40	45	50	60	
L3	31	36 38	42	51	57	60	65	80	
R	27	32.5 35	40.5	47	52	56	61	72.5	
E	16	20	22	25	28	32	35	44	
H	13	17	19	22	24	27	30	38	

Recommended dimensions

Right NAK: 1XXAXXX



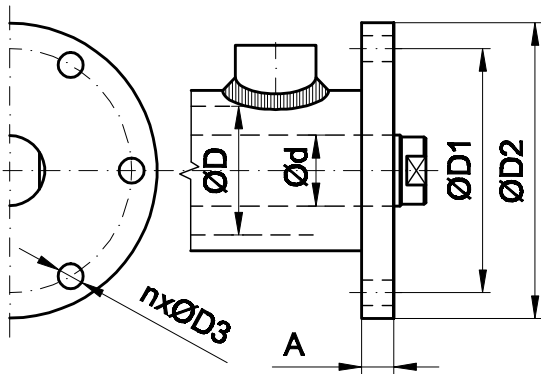
Cap fixed eye with sliding bearing Constr. 2

ØD2	30	35	40	45	50	60	70	80	
L3	31	36 38	42	51	57	60	65	80	
R	27	32.5 35	40.5	47	52	56	61	72.5	
E	25	25	30	30	40	40	50	50	

Recommended dimensions

Right NAK: 2XXAXXX

Dimensions Lo, Dv according the cylinder type



Flange (welded)

Constr. 3

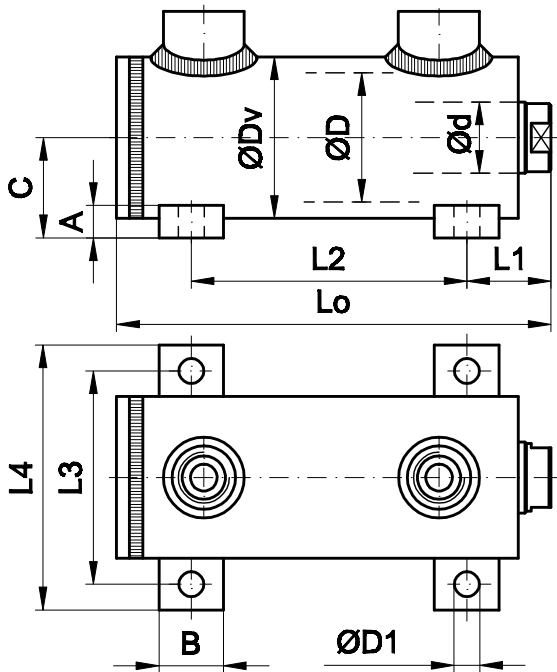
ØD	40	50	63	80	90	100	110	125	140
ØD1	80	90	110	130	150	160	170	200	220
ØD2	100	110	140	160	180	200	210	250	270
ØD3	9	11	13	17	17	21	21	25	25
A	12	15	18	20	20	20	20	24	24
n	6	6	6	6	6	6	6	8	8

n - number of holes at flange

Recommended dimensions

Possible different mounting (head, cap, other)

Right NAK: 3XXAXXX



Lugs or plate

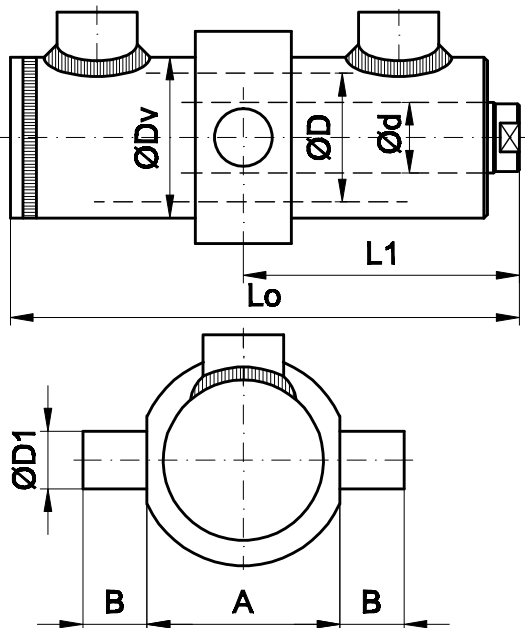
Constr. 4

ØD	40	50	63	80	90	100	110	125	140
A	12	16	20	24	Need to consult				
B	24	24	32	40					
C	30	40	50	60					
ØD1	13	13	17	17					
L1	30	35	40	50					
L2	according specification								
L3	75	85	110	130					
L4	100	110	140	160					

Recommended dimensions

Possible different mounting

Right NAK: 4XXAXXX



Trunnion

Constr. 5

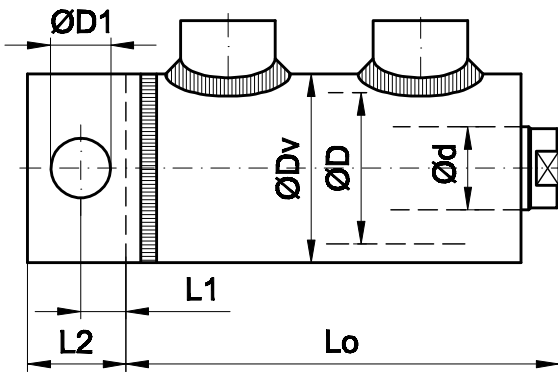
ØD	40	50	63	80	90	100	110	125	140
A	64	80	100	120	Need to consult				
B	16	20	24	30					
ØD1	20	25	30	40					
L1	according specification								

Recommended dimensions

Possible different mounting

Right NAK: 5XXAXXX

Dimensions L<sub>0</sub>, D<sub>v</sub> according the cylinder type



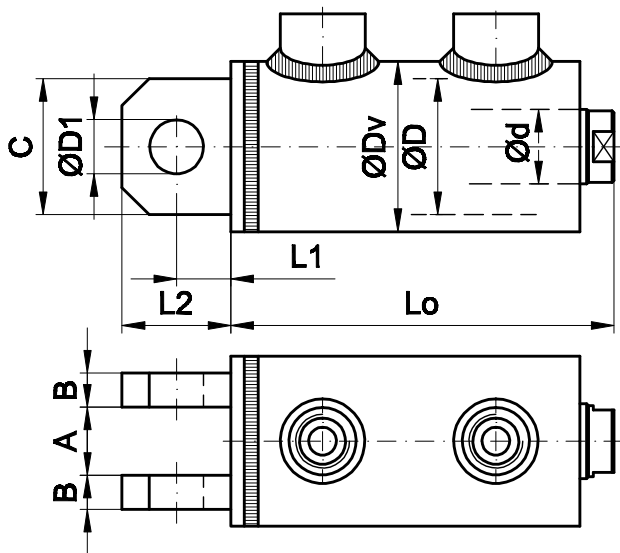
Hole at elongated cap

Constr. 6

ØD	40	50	63	80	90	100	110	125	140
ØD1	20	25	30	40	45	50	55	60	70
L1	16	20	25	30	35	40	45	50	55
L2	32	40	50	60	70	80	90	100	110

Recommended dimensions

Right NAK: 6XXAXXX



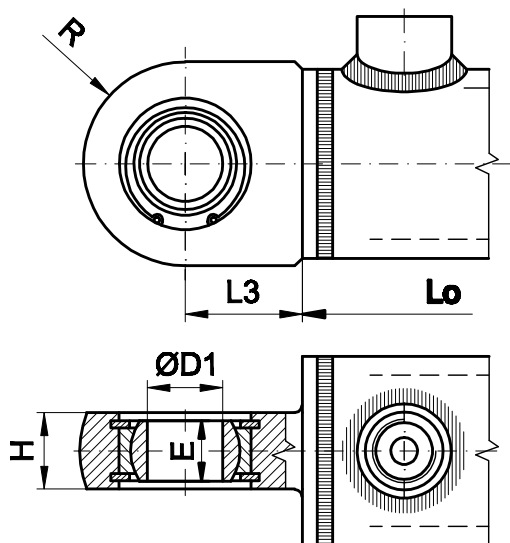
Cap with clevis

Constr. 7

ØD	40	50	63	80	90	100	110	125	140
A	16	20	24	32	36	40	44	50	56
B	8	10	12	16	18	20	22	25	28
C	40	50	60	80	85	95	100	115	130
ØD1	20	25	30	40	45	50	55	60	70
L1	25	32	38	50	56	60	65	75	80
L2	41	52	62	82	92	100	110	125	135

Recommended dimensions

Right NAK: 7XXAXXX



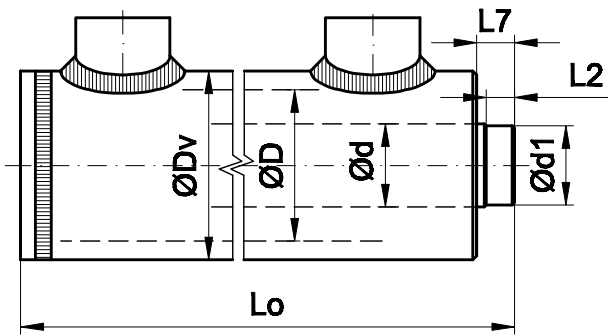
Spherical plain bearings with retaining ring Constr. 8

ØD1	20	25	30	35	40	45	50	60	
R	27	32.5	40.5	47	52	56	61	72.5	
E	16	20	22	25	28	32	35	44	
H	22	26	28	32	34	38	42	50	

Recommended dimensions

Right NAK: 8XXAXXX

Dimensions Lo, L3, Dv according the cylinder type



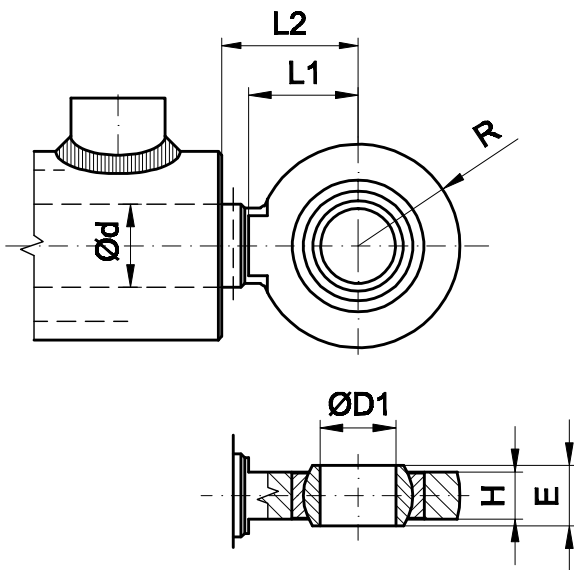
Plain

Constr. 0

Ød	18	22	25	28	32	36	40	45	50	55	63	70	80	90
Ød1	17.5	21	24.5	27	31	35	39	44	49	54	62	69	79	89
L2	6.5	6.5	7.5	7.5	6.5	6.5	9.5	9.5	9.5	12.5	16.5	16.5	16.5	16.5
L7	10	10	10	10	11	11	12	15	15	17	22	20	20	20

Recommended dimensions

Right NAK: XXXAXX0

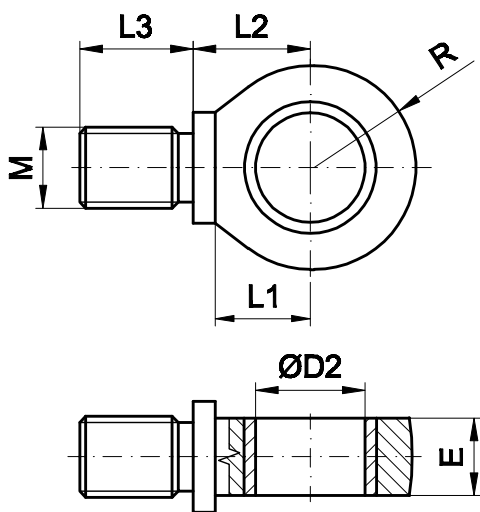


Welded eye with spherical plain bearing Constr. 1

Ød	18	22	25	32	40	45	50	55	63	70
ØD1	20	20	25	25	30	35	40	45	50	60
L1	24	29	34	38	42	53	58	64	69	77
L2 min.	40	36	39	46	47	73	83	88	102	110
R	27	27	32.5	35	40.5	47	51	60	61	80
E	16	16	20	20	22	25	28	32	35	44
H	13	13	17	17	19	24	25	28	32	38

Recommended dimensions

Right NAK: XXXAXX1



Eye with sliding bearing

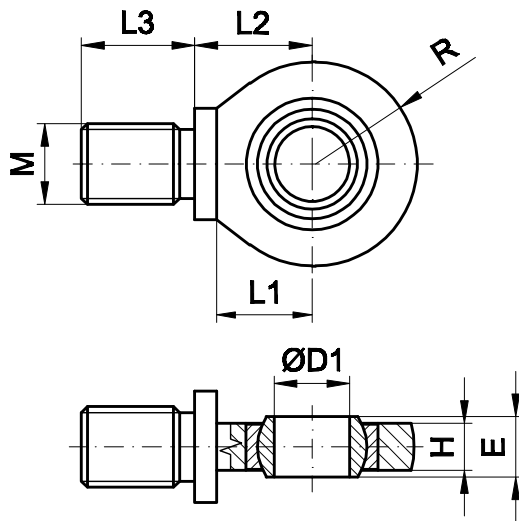
Constr. 2

ØD2	30	35	40	45	50	60	70	80	
L1	29	37 40	41	50	60	60	65	75	
L2	29	37 40	45	58	68	71	80	90	
L3	30	32 34	45	42	52	50	60	60	
R	27	31 35	40.5	47	52	56	61	72.5	
E	25	25	30	30	40	40	50	50	
M	16x1.5	18x1.5 24x1.5	30x2	33x2	36x2	42x2	48x2	52x2	

Recommended dimensions

Right NAK: XXXAXX2

Dimensions L<sub>0</sub>, D<sub>v</sub> according the cylinder type

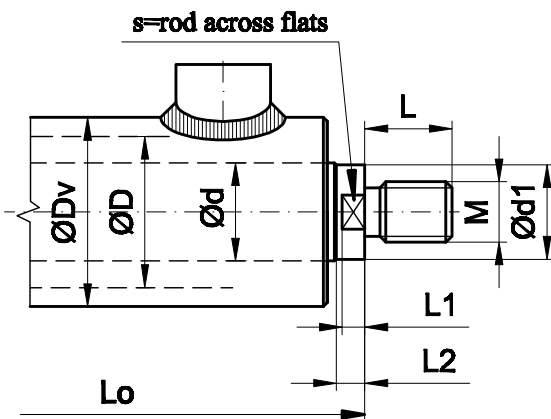


Screwed eye with spherical plain bearing Constr. 3

ØD1	20	25	30	35	40	45	50	60	
L1	29	37 40	41	50	60	60	65	75	
L2	29	37 40	45	58	68	71	80	90	
L3	30	32 34	45	42	52	50	60	60	
R	27	31 35	40.5	47	52	56	61	72.5	
E	16	20	22	25	28	32	35	44	
H	13	17	19	22	24	27	30	38	
M	16x1.5	18x1.5 24x1.5	30x2	33x2	36x2	42x2	48x2	52x2	

Recommended dimensions

Right NAK: XXXAXX3

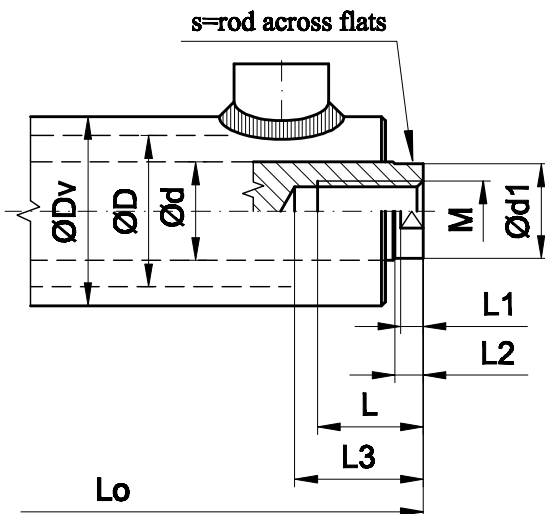


Male thread Constr. 4

ØD	40	50	63	80	90	100	110	125	140
Ød	22 25 28	25 28 32	32 36 40	40 45 50	45 50 55	50 55 63	55 63 70	63 70 80	70 80 90
L	22	30	30	45	45	45	50	63	80
M	16x1.5	18x1.5	24x1.5	30x2	33x2	36x2	42x2	48x2	52x2

Recommended dimensions

Right NAK: XXXAXX4



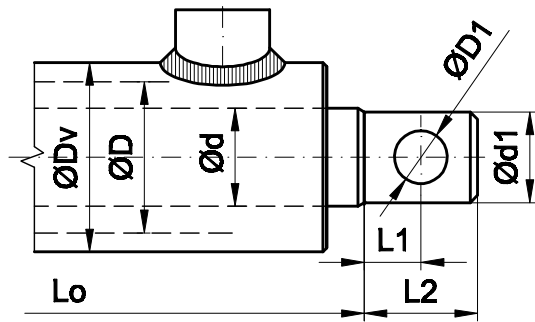
Female thread Constr. 5

ØD	40	50	63	80	90	100	110	125	140
Ød	22 25 28	25 28 32	32 36 40	40 45 50	45 50 55	50 55 63	55 63 70	63 70 80	70 80 90
L	35	36	46	51	45	55	55	65	65
L3	42	42	52	60	52	63	65	75	75
M	16x1.5	18x1.5	24x1.5	30x2	33x2	36x2	42x2	48x2	52x2

Recommended dimensions

Right NAK: XXXAXX5

Dimensions Lo, Dv according the cylinder type



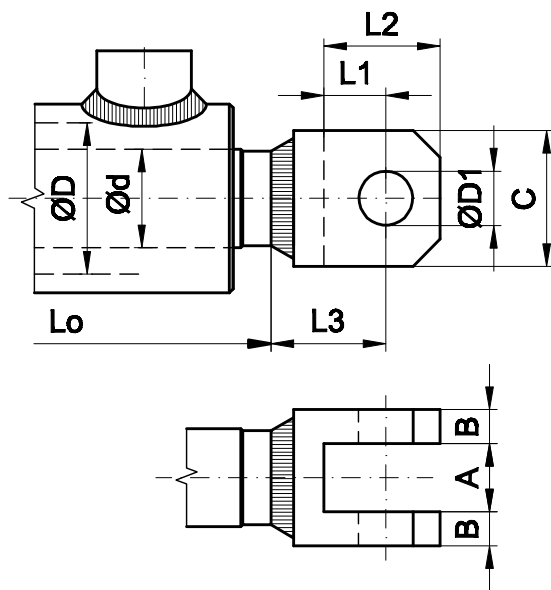
Hole (pin)

Constr. 6

ØD	40	50	63	80	90	100	110	125	140
Ød	22 25 28	25 28 32	32 36 40	40 45 50	45 50 55	50 55 63	55 63 70	63 70 80	70 80 90
Ød1	21 24 27	24 27 31	31 35 39	39 44 49	44 49 54	49 54 62	54 62 69	62 69 79	69 79 89
ØD1	12 14 16	14 16 18	18 20 22	22 24 25	24 25 28	25 28 30	28 30 35	30 35 40	35 40 45
L1	16	20	25	30	35	40	45	50	55
L2	32	40	50	60	70	80	90	100	110

Recommended dimensions

Right NAK: XXXAXX6



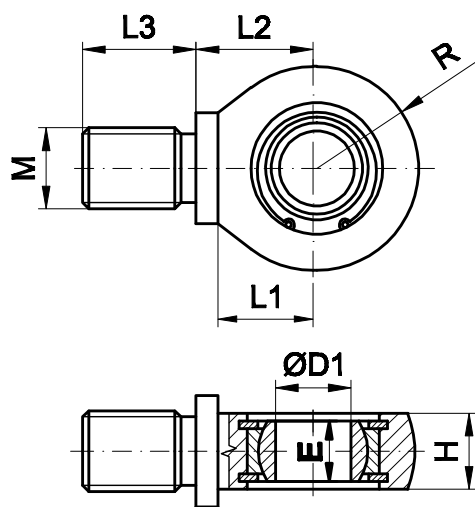
Clevis

Constr. 7

ØD	40	50	63	80	90	100	110	125	140
A	16	20	24	32	36	40	44	50	56
B	8	10	12	16	18	20	22	25	28
C	40	50	60	80	85	95	100	115	130
ØD1	20	25	30	40	45	50	55	60	70
L1	25	32	38	50	56	60	65	75	80
L2	41	52	62	82	92	100	110	125	135
L3	45	55	65	85	95	100	110	125	135

Recommended dimensions

Right NAK: XXXAXX7



Screwed eye with spherical plain bearing with retaining ring

Constr. 8

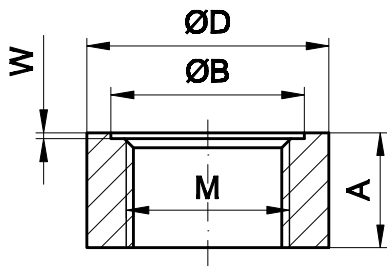
ØD1	20	25	30	35	40	45	50	60	
L1	29	37 40	41	50	60	60	65	75	
L2	29	37 40	45	58	68	71	80	90	
L3	30	32 34	45	42	52	50	60	60	
R	27	31 35	40.5	47	52	56	61	72.5	
E	16	20	22	25	28	32	35	44	
H	20	26	28	32	34	38	42	50	
M	16x1.5	18x1.5 24x1.5	30x2	33x2	36x2	42x2	48x2	52x2	

Recommended dimensions

Right NAK: XXXAXX8

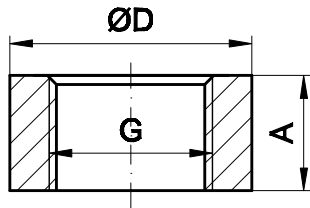
Dimensions L0, Dv according the cylinder type





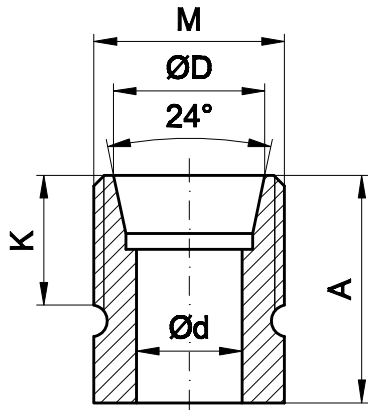
Ports - metric thread

M	12x1.5	14x1.5	16x1.5	18x1.5	20x1.5	22x1.5	27x2	33x2	
ØB	16	18	20	22	24	27	32	39	
ØD	20	22	25	28	28	32	40	50	
A	14	14	14	16	16	18	19	22	
W	0.5	1	1	1	1	1	1	1	



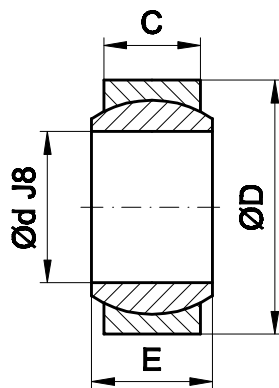
Ports - "G" cylindrical thread

G	G1/4"	G3/8"	G1/2"	G3/4"	G1"	
ØD	25	25	32	40	50	
A	14	14	18	19	22	



Fittings - metric thread

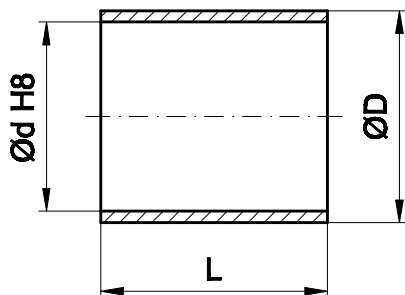
M	12x1.5	14x1.5	16x1.5	18x1.5	20x1.5	22x1.5	24x1.5	27x2	
Ød	5	6	8	10	10	12	14	16	
ØD	8.1	10.1	12.3	14.3	14.3	17.3	18.3	20.3	
A	14	16	18	20	20	22	24	28	
K	7	8	10	12	12	14	16	14	



Spherical plain bearings type GE

Ød	20	25	30	35	40	45	50	60	70
ØD	35	42	47	55	62	68	75	90	105
C	12	16	18	20	22	25	28	36	40
E	16	20	22	25	28	32	35	44	49
sign	GE20	GE25	GE30	GE35	GE40	GE45	GE50	GE60	GE70

Recommended tolerance for pivot pin: h6



Sliding bearings type KU and KX (bushes)

Ød	20	25	30	35	40	45	50	55	60	65	70	75	80
ØD	23	28	34	39	44	50	55	60	65	70	75	80	85
L	10 ‡ 30	15 ‡ 30	20 ‡ 40	20 ‡ 50	20 ‡ 50	30 ‡ 50	30 ‡ 60	40 ‡ 60	40 ‡ 60	40 ‡ 60	40 ‡ 80	40 ‡ 80	40 ‡ 80

Recommended tolerance for pivot pin: f7 (KU)

Recommended tolerance for pivot pin: h8 (KX)

Lengths L: 10,15,20,25,30,40,50,60,70,80

# TABLE OF RECOMMENDED STROKES AND POWERS



cylinder ØD	piston rod Ød	TABLE OF RECOMMENDED STROKES FOR WORKING PRESSURE 16 MPa																	
		50	63	80	100	125	160	200	250	320	400	500	630	800	900	1000	1100	1200	
32	18	●	●	●	●	●	●	●	●	○	○								
40	22		●	●	●	●	●	●	●	●	○	○							
50	25			●	●	●	●	●	●	●	○	○							
63	32				●	●	●	●	●	●	●	○	○						
70	36				●	●	●	●	●	●	●	●	○	○					
80	40				●	●	●	●	●	●	●	●	○	○					
90	45					●	●	●	●	●	●	●	●	○	○				
100	50					●	●	●	●	●	●	●	●	●	○	○			
110	55					●	●	●	●	●	●	●	●	●	●	○	○		
125	63						●	●	●	●	●	●	●	●	●	●	○	○	
140	70						●	●	●	●	●	●	●	●	●	●	●	●	

- piston rod is suitable in deviation respect at stroke end
- piston rod is not suitable in deviation respect at stroke end

TABLE OF CYLINDER POWER					Value of power at kN, efficiency 0.95				
cylinder ØD	PUSH POWER BY PRESSURE				piston rod Ød	PULL POWER BY PRESSURE			
	12 MPa	16 MPa	20MPa	25MPa		12 MPa	16 MPa	20MPa	25MPa
32	9.2	12.2	15.3	19.1	18	6.3	8.4	10.5	13.1
					22	4.8	6.4	8.1	10.1
40	14.3	19.1	23.9	29.8	22	10.0	13.3	16.7	20.8
					25	8.7	11.6	14.6	18.2
					28	7.3	9.7	12.2	15.2
50	22.4	29.8	37.3	46.6	25	16.8	22.4	28.0	35.0
					28	15.4	20.5	25.6	32.0
					32	13.2	17.6	22.0	27.5
63	35.5	47.4	59.2	74.1	32	26.4	35.2	44.0	54.9
					36	23.9	31.9	39.9	49.9
					40	21.2	28.3	35.4	44.2
70	43.9	58.5	73.1	91.4	36	32.3	43.0	53.8	67.2
					40	29.5	39.4	49.2	61.6
					45	25.7	34.3	42.9	53.7
80	57.3	76.4	95.5	119.4	40	43.0	57.3	71.6	89.6
					45	39.2	52.2	65.3	81.6
					50	34.9	46.6	58.2	72.8
90	72.5	96.7	120.9	151.1	45	54.4	72.5	90.7	113.3
					50	50.1	66.9	83.6	104.5
					55	45.4	60.6	75.7	94.7
100	89.5	119.4	149.2	186.5	50	67.2	89.5	111.9	139.9
					55	62.5	83.3	104.1	130.1
					63	54.0	72.0	90.0	112.5
110	108.4	144.5	180.6	225.7	55	81.3	108.4	135.4	169.3
					63	72.8	97.1	121.4	151.7
					70	64.5	86.0	107.5	134.3
125	133.9	186.5	233.19	291.5	63	104.4	139.2	174.0	217.5
					70	96.0	128.0	160.0	200.1
					80	82.6	110.1	137.7	172.1
140	175.5	234.0	292.52	365.6	70	131.6	175.5	219.4	274.2
					80	118.2	157.6	197.0	246.3
					90	103.0	137.3	171.6	214.5