

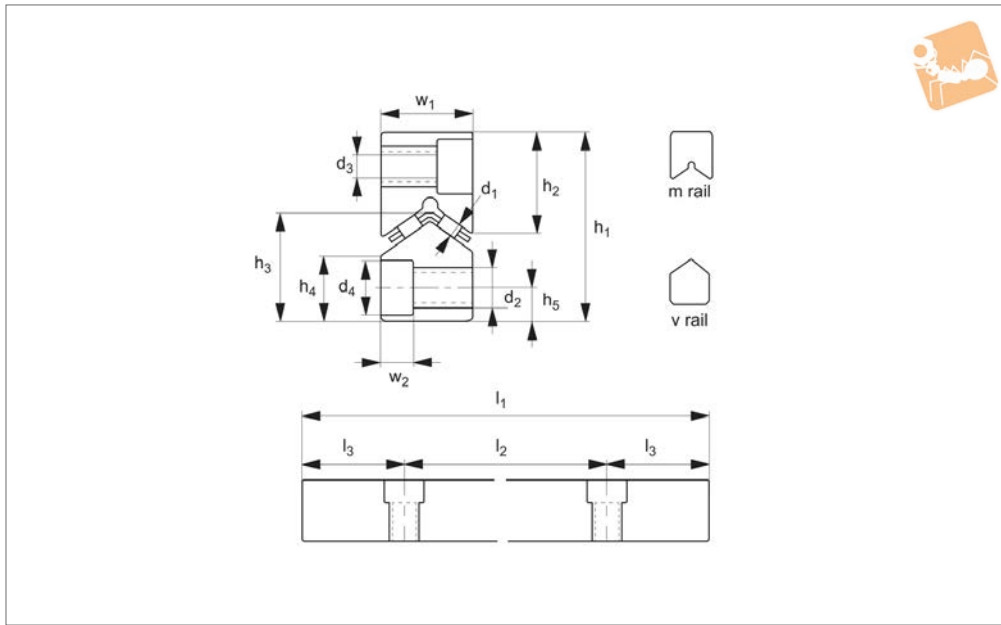


# Needle Roller Rail Sets - V rail

high load capacity



## Linear Rail Sets



## L1004.V

LINEAR RAIL SETS

### Material

Hardened steel alloy (DIN 1.2842), hardness 60±2 HRC.

### Technical Notes

Normally supplied in a set of 4 (two M and two V) with needle rollers in aluminium cage - **(cage length required needs to be**

**specified)**, with GM end stops.

M and V type rails do not need to be of same length.

### Tips

For specific length needle roller cages (aluminium HW type normally used) and end stops please see technical pages.

Needle roller rails have a higher load rating than cross roller rails (L1000). The length of the cage affects both the stroke of the rail and it's load carrying capacity see technical pages.

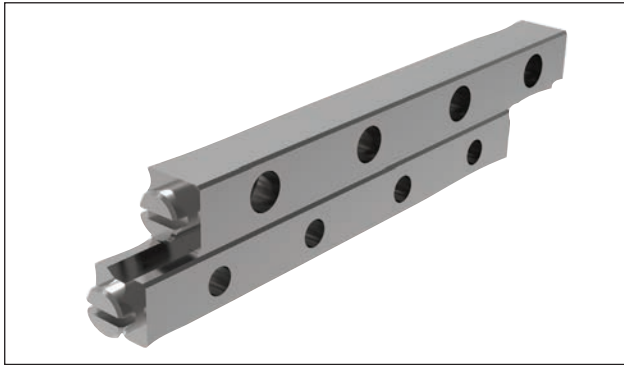
Order No.	Rail type	$h_1$ +0 -0.3	$w_1$	$l_1$	$l_2$	$l_3$	$h_2$	$h_3$	$h_4$	$h_5$	$w_2$	$d_1$	$d_2$	$d_3$	$d_4$	Weight kg
L1004.V22-0200	V	44	22	200	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	0.70
L1004.V22-0300	V	44	22	300	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	1.03
L1004.V22-0400	V	44	22	400	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	1.37
L1004.V22-0500	V	44	22	500	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	1.70
L1004.V22-0600	V	44	22	600	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	2.04
L1004.V22-0700	V	44	22	700	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	2.37
L1004.V22-0800	V	44	22	800	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	2.71
L1004.V22-0900	V	44	22	900	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	3.04
L1004.V22-1000	V	44	22	1000	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	3.38
L1004.V22-1100	V	44	22	1100	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	3.71
L1004.V22-1200	V	44	22	1200	100	50	24	24.5	15	9	6.2	2	M 8	6.8	10.5	4.05
L1004.V25-0200	V	52	25	200	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	0.90
L1004.V25-0300	V	52	25	300	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	1.35
L1004.V25-0400	V	52	25	400	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	1.80
L1004.V25-0500	V	52	25	500	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	2.25
L1004.V25-0600	V	52	25	600	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	2.70
L1004.V25-0700	V	52	25	700	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	3.15
L1004.V25-0800	V	52	25	800	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	3.60
L1004.V25-0900	V	52	25	900	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	4.05
L1004.V25-1000	V	52	25	1000	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	4.50
L1004.V25-1100	V	52	25	1100	100	50	28	29	18	10	8.2	2	M10	8.5	13.5	4.95
L1004.V25-1200	V	52	25	1200	100	50	28	28	18	10	8.2	2	M10	8.5	13.5	5.40
L1004.V30-0300	V	62	30	300	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	1.97
L1004.V30-0400	V	62	30	400	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	2.62
L1004.V30-0500	V	62	30	500	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	3.28
L1004.V30-0600	V	62	30	600	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	3.93
L1004.V30-0700	V	62	30	700	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	4.59
L1004.V30-0800	V	62	30	800	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	5.24
L1004.V30-0900	V	62	30	900	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	6.00
L1004.V30-1000	V	62	30	1000	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	6.65



LINEAR RAIL SETS

Order No.	Rail type	$h_1$ +0 -0.3	$w_1$	$l_1$	$l_2$	$l_3$	$h_2$	$h_3$	$h_4$	$h_5$	$w_2$	$d_1$	$d_2$	$d_3$	$d_4$	Weight kg
L1004.V30-1100	V	62	30	1100	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	7.21
L1004.V30-1200	V	62	30	1200	100	50	34	35	22	12	10.2	2.5	M12	10.5	16.5	7.86
L1004.V35-0400	V	74	35	400	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	3.46
L1004.V35-0500	V	74	35	500	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	4.33
L1004.V35-0600	V	74	35	600	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	5.19
L1004.V35-0700	V	74	35	700	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	6.06
L1004.V35-0800	V	74	35	800	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	6.92
L1004.V35-0900	V	74	35	900	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	7.79
L1004.V35-1000	V	74	35	1000	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	8.65
L1004.V35-1100	V	74	35	1100	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	9.52
L1004.V35-1200	V	74	35	1200	100	50	42.5	40	25	14	12.2	3	M14	12.5	18.5	1.04
L1004.V45-0500	V	78	45	500	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	6.10
L1004.V45-0600	V	78	45	600	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	7.32
L1004.V45-0700	V	78	45	700	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	8.54
L1004.V45-0800	V	78	45	800	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	9.76
L1004.V45-0900	V	78	45	900	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	10.98
L1004.V45-1000	V	78	45	1000	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	12.20
L1004.V45-1100	V	78	45	1100	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	13.42
L1004.V45-1200	V	78	45	1200	100	50	45	45	25	14	12.2	3.5	M14	12.5	18.5	14.64

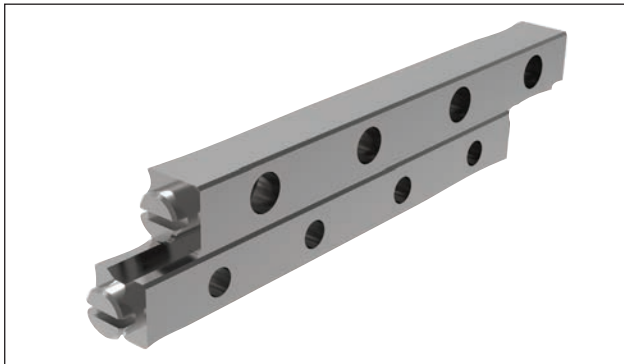




### Standard cross roller rail sets

#### L1000 & L1001

- Seven rail profiles (Sizes 1-12)
- Lengths: 20mm to 1 metre
- L1000 standard rail set
- L1001 corrosion resistant rail sets



### Deep groove and anti-creep rail sets

#### L1002 + L1003

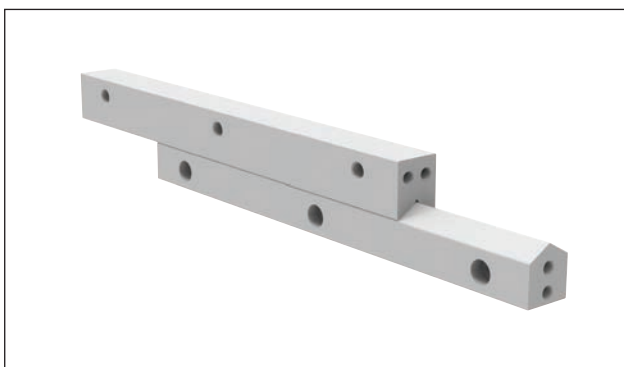
- 3 x load capacity of standard rail sets (due to deep V groove)
- Two rail profiles (Sizes 4 & 6)
- Lengths 50mm to 400mm
- Anti-creep versions for high acceleration applications



### Needle roller rail sets

#### L1004

- Heavy load ratings and needle rollers are used
- Five rail profile size
- Lengths: 200mm to 1.2 metres



### Anti-friction coated rail sets

#### L1005 & L1006

- Same profile as needle roller rails but contact face Teflon coated.
- Ideal for harsh, dirty conditions
- Vibration damping characteristics



**Our cross roller rail sets are of the highest quality.**

- Close tolerance  $\pm 5\mu$
- Speeds up to 50 m/min
- Temperature range  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  up to  $+250^{\circ}\text{C}$  if applying a temperature factor
- Through hardened to  $60 \pm 2$  HRC
- Acceleration up to  $50 \text{ m/sec}^2$
- Typical 0.003 coefficient of friction dependent on mounting surface accuracy

**Expected life calculation:**

$$\text{Life (Km)} L = (C/P)^{3.3} \times 1.15 \times 10^5 \text{m}$$

C = effective dynamic load (N)

P = equivalent load (N)

**Working life calculation:**

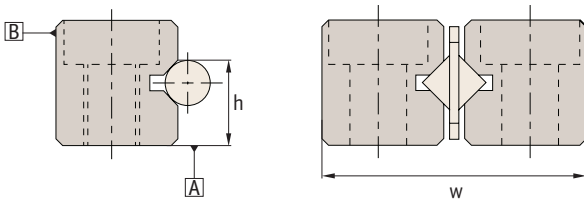
$$L_h \text{ (hours)} = \frac{L \times 10^6}{2 \times L_s \times n \times 60}$$

L = Life (Km), see above

$L_s$  = Stroke Length (mm)

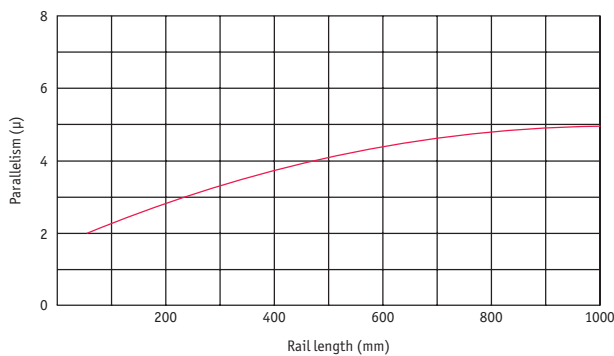
n = Number of operations/min

**Accuracy Specification:**



Accuracy level	
Parallelism of rolling plane A&B	graph below
Allowable height tolerance (h)	$\pm 0,02$
Paired mutual height tolerance (h)	0,01
Allowable width tolerance (w)	$+0, -0,02$

**Parallelism**



**Lubrication:**

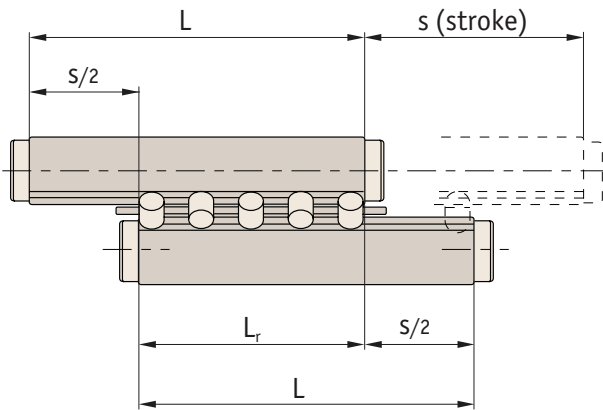
The units are lubricated with lithium soap lubricant. Relubricate if required.

Straightness		
Length (mm)		Straightness ( $\mu$ )
Above	Below	
0	50	2,0
50	100	2,0
100	160	3,0
160	310	3,0
310	510	4,0
510	600	4,0

(Ra 0,2  $\mu\text{m}$ )

### Load capacity depends on:

- Rail size
- Number of rollers in cage
- Load rating = number of rollers x load rating/roller
- Number of rollers ( $N_r$ ) = cage length ( $L_c$ ) / pitch  $p$
- Cage length affects the stroke and travel of the system



### Load calculations

Calculations of retainer length and number of rollers:

$$L_r = \frac{L - S}{2}$$

$L_r$  = distance between two rollers in ends of retainer (mm)

$L$  = rail length (mm)

$S$  = stroke length (mm)

### Worked example:

Assume L1000.09-400 with a stroke of 250mm:

Cage length =  $400 - (250/2) = 275$ mm

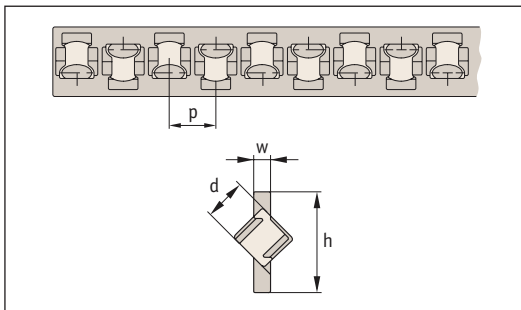
Roller  $\varnothing = 9$ mm with a pitch (see table) of 18mm:

Number of rollers =  $275/18 = 15$

Load rating of system = load/roller\* x no. of rollers  
(a pair of rollers) =  $2420N \times 15$   
= 36,300N

\*See product table for allowable load per roller.

Allowable load rating with a 3x safety factor compared to static load.



### Plastic cage



L1008.###-PR-xxx

Plastic cage with steel rollers,  
for horizontal and vertical use.

### Steel cage



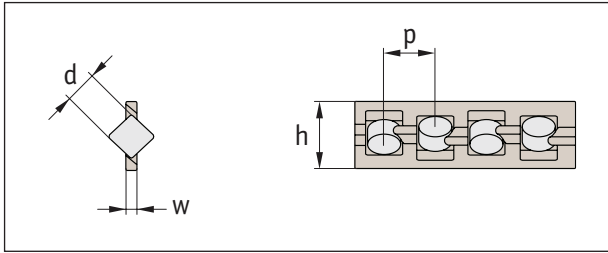
L1008.###-AA-xxx

Steel cage with steel rollers,  
for horizontal use only.

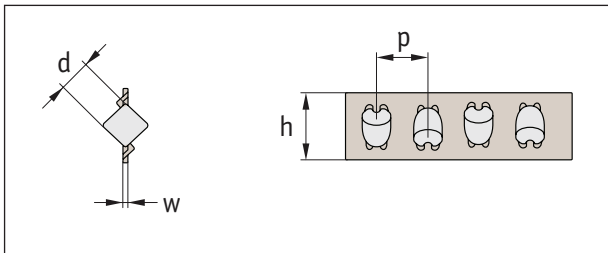
Order no.	d	p	h	w	Cage material
L1008.020-PR-xxx	2	3,9	5	0,75	Plastic - black
L1008.030-PR-xxx	3	5,0	7	1,00	Plastic - black
L1008.060-PR-xxx	6	8,5	14	2,00	Plastic - black
L1008.090-PR-xxx	9	14,0	20	3,00	Plastic - black
L1008.020-AA-xxx	2	4	5,5	0,80	Steel
L1008.030-AA-xxx	3	5	7,5	0,50	Steel
L1008.060-AA-xxx	6	12	14	0,80	Steel
L1008.090-AA-xxx	9	18	19,5	1,00	Steel
L1008.120-AA-xxx	12	22	25	1,20	Steel



### Plastic cage (type PR)



### Steel cage (type AA)



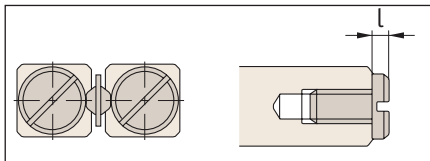
#### Roller load ratings (per roller)

Rail size	Max. dynamic load $C_0$ N	Max. static load C N	Allowable* load N
1	125	144	48
2	290	290	95
3	630	760	250
4	1230	1170	390
6	2570	2630	870
9	7190	7270	2420
12	14700	13100	4300

The more rollers the greater the load capacity

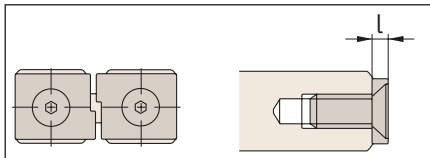
\* Allowable load is 1/3 of max. static load/roller, to allow a safety factor in calculations of 3.

### End pieces



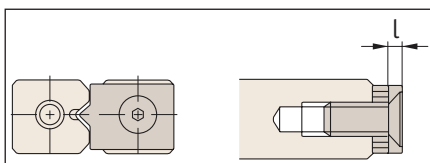
#### Type GA

- For horizontal applications, most used.



#### Type GB

- For horizontal or vertical applications.



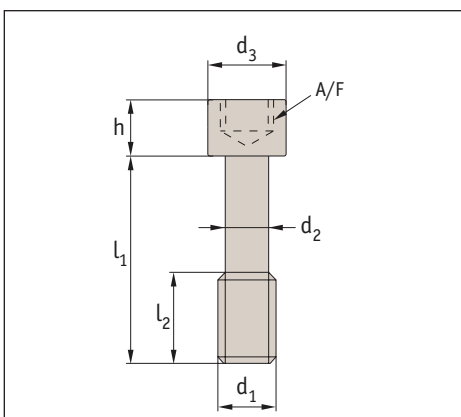
#### Type GC

- For horizontal or vertical applications.
- Mount on longer rail only.

#### Type

Rail size	GA l	GB l	GC l
1	1,5	-	-
2	2	3	-
3	2	2	3
6	3	3	5
9	3	4	6
12	3	5	8

### End screws



Rail	h	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	A/F
3	3	M3	2,3	5	12	5	2,5
6	5	M5	3,9	8	20	8	4
9	6	M6	4,6	8,5	30	12	5
12	8	M8	6,25	11,3	40	17	6