

# Pneumatic cylinder

**TOSS<sup>®</sup>**

## Type A

double-acting

Linear Ball Slide  
 Ø 10/16/20  
 25/32/40 mm

(phase-out model)



The ball slides consist of hardened and ground angular rails provided with linear cages for balls, which allows to apply stress on all sides.

### Technical data:

Type	10 - A	16 - A	20 - A	25 - A	32 - A	40 - A
Design type	Pneumatic cylinder with linear ball guide					
Stroke length [mm]	10, 25, 50, 80, 100, 125, 160, 200					
Fitting position	any (as long as extended position is possible)					
Adm. temperature range [°C]	-10 to +70					
Medium	Filtered, oiled or non-oiled compressed-air (min. fineness 40µm)					
Compressed-air supply	Front, lateral or combi-type					
Compressed-air [bar]	min. 2 ... max. 6					
Materials	Base body, upper part, mounting plate, cover, piston plate: Al Guides: Ck 75 g, piston rod: Ck 45 SL f7 Piston: Ms 58 Seals: NBR, cylinder barrel: Ms 63					

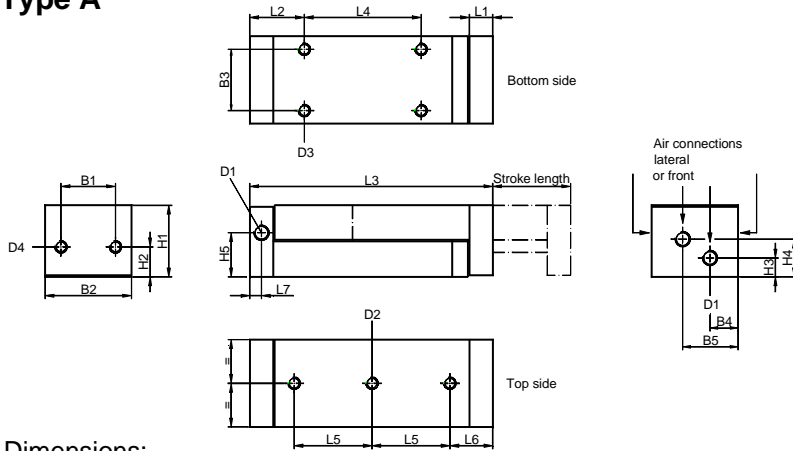
### Weights: (gramme)

Stroke length [mm]	Piston - Ø [mm]					
	10	16	20	25	32	40
10	170	270	365	705	900	1400
25	205	320	420	850	1050	1550
50	290	465	600	1050	1350	2000
80	375	590	775	1400	1800	2550
100	425	680	875	1650	2100	2950
125	530	835	1050	1900	2300	3370
160	640	1000	1300	2300	2900	3990
200	740	1200	1500	2700	3500	4800

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## Type A



Dimensions:

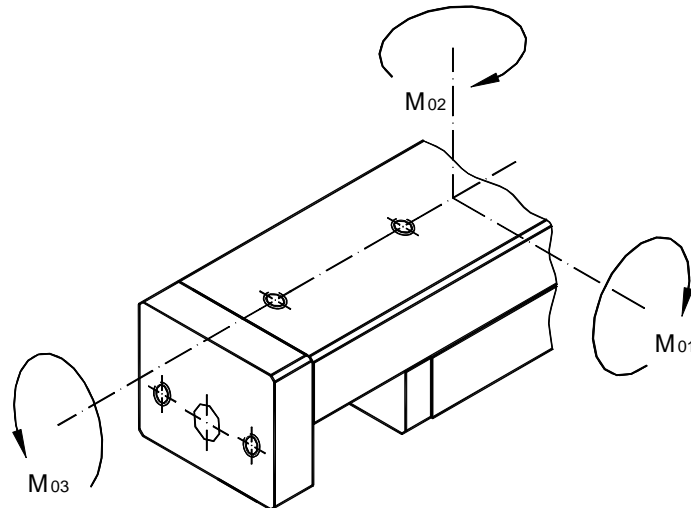
Piston Ø [mm]	Piston rod Ø [mm]	B1 [mm]	B2 [mm]	B3 [mm]	B4 [mm]	B5 [mm]	D1	D2/depth [mm]	D3/depth [mm]	D4/depth [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	H5 [mm]	L1 [mm]
10	5	20	30,5	20	9,75	18,75	M5	M6/5,5	M6/7	M6/11,5	25	10,0	16,8	7,3	14,5	12
16	8	30	40,5	30	10,75	26,75	M5	M6/5,5	M6/11	M6/11,5	30	12,0	6,8	15,3	19	12
20	8	30	40,5	30	11,5	25,5	M5	M6/8,0	M6/14	M6/11,5	39,5	17,5	10,3	21,8	10,3	12
25	10	35	55,5	39	17,75	35	G1/8	M8/7,5	M8/16	M8/10,5	45,5	19,5	12	24	28	15
32	12	45	65,5	49	20,25	40,75	G1/8	M8/7,5	M8/18	M8/10,5	50,7	20,7	10,8	28,3	31,3	15
40	15	50	70,5	54	20,25	43,25	G1/4	M8/10,5	M8/18	M8/10,5	65	27,0	17,3	36,3	40,5	20

Piston - Ø [mm]	Stroke length [mm]								
	10	25	50	80	100	125	160	200	
10 / 16	L2	27	27	27	27	27	27	27	27
	L3	80	95	135	175	200	245	305	360
	L4	15	30	70	2 x 55	2 x 67,5	2 x 90	2 x 120	2 x 147,5
	L5	31	2 x 23	2 x 43	3 x 42	3 x 50	3 x 65	3 x 85	4 x 78
	L6	24,0	24,0	24,0	24,0	24,5	24,5	24,5	23,5
	L7	6	6	6	6	6	6	6	6
20	L2	22	27	27	27	27	27	27	27
	L3	80	95	135	175	200	245	305	360
	L4	25	30	70	2 x 55	2 x 67,5	2 x 90	2 x 120	2 x 147,5
	L5	31	2 x 23	2 x 43	3 x 42	3 x 50	3 x 65	3 x 85	4 x 78
	L6	24,0	24,0	24,0	24,0	24,5	24,5	24,5	23,5
	L7	6	6	6	6	6	6	6	6
25 / 32	L2	35	35	35	35	35	35	35	35
	L3	101	121	156	211	246	286	341	411
	L4	20	40	75	130	2 x 82,5	2 x 102,5	2 x 130	2 x 165
	L5	45	65	2 x 50	2 x 78	2 x 95	3 x 77	3 x 95	3 x 115
	L6	27,5	27,5	27,5	27,0	27,5	27,0	27,5	32,5
	L7	7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5
40	L2	40	40	40	40	40	40	40	40
	L3	111	131	166	221	256	296	351	421
	L4	20	40	75	130	2 x 82,5	2 x 102,5	2 x 130	2 x 165
	L5	45	65	2 x 50	2 x 78	2 x 95	3 x 77	3 x 95	3 x 115
	L6	32,5	32,5	32,5	32,0	32,5	32,0	32,5	37,5
	L7	10	10	10	10	10	10	10	10

# Pneumatic cylinder



Admissible stress  
**Type A**



Longitudinal torque	Lateral torque	Transverse torque
$F_{01} \leq \frac{M_{01} \text{ zul.}}{L_1 + A}$	$F_{02} \leq \frac{M_{02} \text{ zul.}}{L_2 + A}$	$F_{03} \leq \frac{M_{03} \text{ zul.}}{L_3 + B}$
$F_{01} \leq \frac{M_{01} \text{ zul.}}{L_1 + C}$	$F_{02} \leq \frac{M_{02} \text{ zul.}}{L_2 + B}$	$F_{03} \leq \frac{M_{03} \text{ zul.}}{L_3 + C}$

# Pneumatic cylinder

## Admissible stress



Stroke length [mm]	10		25		50		80		100		125	
∅ / Type	M1/M2 Nm	M3 Nm	M1/M2 Nm	M3 Nm	M1/M2 Nm	M3 Nm	M1/M2 Nm	M3 Nm	M1/M2 Nm	M3 Nm	M1/M2 Nm	M3 Nm
10 - A	1,10	0,63	1,13	0,63	1,69	0,87	2,08	1,06	2,58	1,31	3,14	1,31
16 - A	1,21	0,92	1,26	0,92	1,88	1,28	2,30	1,56	2,87	1,93	3,49	1,93
20 - A	1,33	1,01	1,39	1,01	2,06	1,41	2,53	1,72	3,16	2,13	3,84	2,13
25 - A	2,65	2,12	3,06	2,12	3,88	3,32	5,36	4,54	6,45	5,45	10,40	5,45
32 - A	3,68	3,1	3,82	3,64	5,08	4,70	7,44	6,78	8,67	7,80	10,45	7,80
40 - A	4,04	3,53	4,20	4,13	5,60	5,33	8,19	7,67	9,53	8,83	11,50	8,83

Stroke length [mm]	160		200	
∅ / Type	M1/M2 Nm	M3 Nm	M1/M2 Nm	M3 Nm
10 - A	4,17	1,31	4,90	1,31
16 - A	4,64	1,93	5,44	1,93
20 - A	5,10	2,13	6,00	2,13
25 - A	9,10	5,45	10,96	5,45
32 - A	11,82	7,80	14,78	7,80
40 - A	13,00	8,83	16,25	8,83

### Correction factors:

∅ / Type	Stroke length	A	B	C
	[mm]	[mm]	[mm]	[mm]
10 - A	10	40,6	15,25	10,25
	25	48,1		
	50	66,9		
	80	86,1		
	100	98,4		
	125	121,2		
	160	151,3		
	200	178,1		

∅ / Type	Stroke length	A	B	C
	[mm]	[mm]	[mm]	[mm]
16 - A	10	40,6	20,25	10,25
	25	48,1		
	50	66,9		
	80	86,1		
	100	98,4		
	125	121,2		
	160	151,3		
	200	178,1		

∅ / Type	Stroke length	A	B	C
	[mm]	[mm]	[mm]	[mm]
20 - A	10	40,6	20,25	12,25
	25	48,1		
	50	66,9		
	80	86,1		
	100	98,4		
	125	121,2		
	160	151,3		
	200	178,1		

∅ / Type	Stroke length	A	B	C
	[mm]	[mm]	[mm]	[mm]
25 - A	10	49,2	27,75	15,75
	25	56,7		
	50	77,0		
	80	102,4		
	100	120,2		
	125	140,5		
	160	168,4		
	200	201,4		

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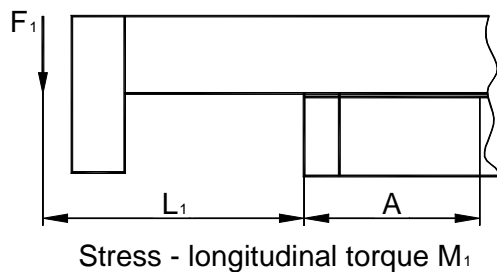
## Admissible stress

Correction factors:

Ø / Type	Stroke length	A	B	C
	[mm]	[mm]	[mm]	[mm]
32 - A	10	49,7	32,75	18,1
	25	57,2		
	50	75,8		
	80	103,2		
	100	119,4		
	125	141,2		
	160	164,9		
	200	200,4		

Ø / Type	Stroke length	A	B	C
	[mm]	[mm]	[mm]	[mm]
40 - A	10	49,7	35,25	20,75
	25	57,2		
	50	75,8		
	80	103,2		
	100	119,4		
	125	141,2		
	160	164,9		
	200	200,4		

Example of calculation:



Given qty: 32 - A with a stroke length of 80 mm  
 Lever arm  $L_1 = 40 \text{ mm} = 0,04 \text{ m}$   
 Longitudinal torque  $M_1 = 7,44 \text{ Nm}$   
 Correction factor  $A = 103,2 \text{ mm} = 0,1032 \text{ m}$

$$\text{Required qty: } F_1 \leq \frac{M_1}{L_1 + A} = \frac{7,44 \text{ Nm}}{0,04 \text{ m} + 0,1032 \text{ m}} = 52 \text{ N}$$