

Type B Forces & Loadings

Calculations guide frame fastener B-Lift

Lift Cage weight G =	170 kg
Max load =	300 kg
Loading test = Max load x 1,2 = Q =	360 kg
B-lift 3000 Frame weight H about~	500 kg

Forces on guide frame by Lift Cage PLAN 1

Moment equation (c.p. **R2**)
 $R1 = (G \times 9,81 \times a) + (Q \times 9,81 \times b) / 0,73$ 8574 N

Static Force Equation

Direction \rightarrow $R2 - R1 = 0$
 therefore $R2 = R1$ (Reaction forces)

Guide frame fastner PLAN 2

We look at the active force **F** which is the same as **R1** and **R2** but opposite direction.

Moment equation frame / lift (c.p. **Rt**)

Clockwise: $F(dx + 0,19 + 0,73) - F(dx + 0,19) - Rb(Lh - dx) = 0$
 Thus $Rb = F \times 0,73 / (Lh - dx)$

Static Force Equation

Direction \rightarrow $F - F - Rt + Rb = 0$
 therefore $Rt = Rb$

B-lift, lift height (L 3000	If dx min	Rt =	2140 N
B-lift, lift height 3000	dx max	Rt =	2479 N
B-lift, lift height 1000	If dx min	Rt =	6766 N
B-lift, lift height 1000	dx max	Rt =	11921 N
B-lift 1000 has the max force	=	11921 N	

Recommend by Swedish Work Environment Authority
 note no 130, increase **Rt** by 40%, = 16,690 N

Mounting bolt M10, structural strength 8.8, breaking stren: 29200 N

Breakage safety, 2 bolts = 3.5 times

The guide frame shall stay against a wall at plan 1.

Not quite necessary if the guide frame on floor has support against wall but to increase guide frame stability we recommend complete with 2 bolts at top of electric motor box.

Max load on floor

B-lift 3000 $G + Q + H = 1030$ kg $(G + Q + H) / \text{basis } 2,50 \times 13,00 = 32$ kg/dm²

Fastner at the top of motor box.

If the guide frame can't be fixed against something at bottom, the fixings at top of motor box will increase the force **Rt**.

Moment equation frame / lift (c.p. **Rt**)

Direction \rightarrow $F(dx + 0,19 + 0,73) - F(dx + 0,19) - Rm(Lh - dx - 0,5) = 0$
 Thus $Rm = F \times 0,73 / (Lh - dx - 0,5)$

B-lift 800, shall be **dx** = min $Rm = Rt = 27818$ N

B-lift 3000 **dx** = max $Rm = Rt = 3091$ N

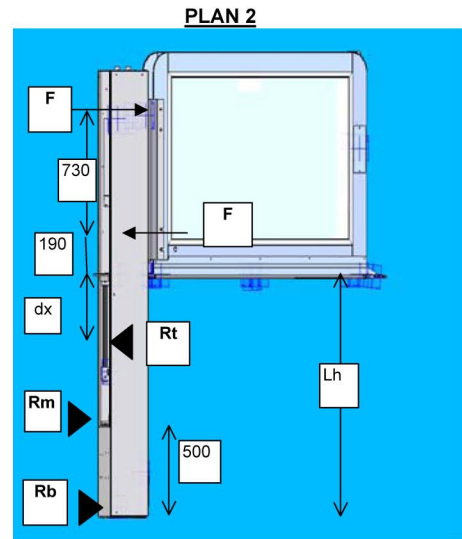
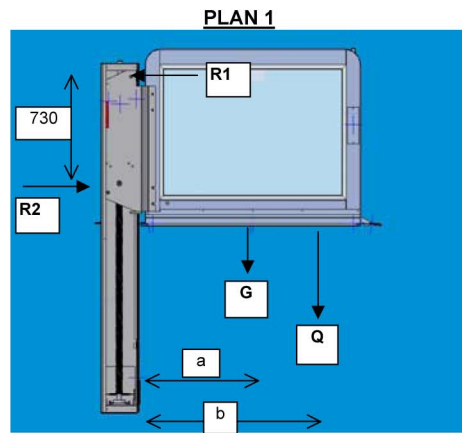
For the small B-lift 800, we check the force on bolts at **Rt**, calculation.

Recommend increase **Rt** by 40%, = 38945 N

Mounting bolt M10, structural strength 8.8, breaking stren: 29200 N

Breakage safety, 2 bolts = 1.5 times

RESULT: Fastner for all B-lifts shall be at least 2 bolts 8.8 M10 at plan 2 and NTD recommend to complete with bolts at motor box for stability.



a =	1 m
b =	1.3 m
c =	0.73 m
dx =	0.075 m min
dx =	0.475 m max possibly



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