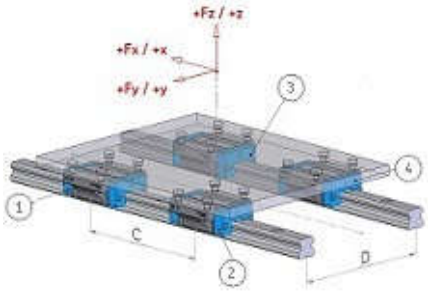
General

Unit system: Metric

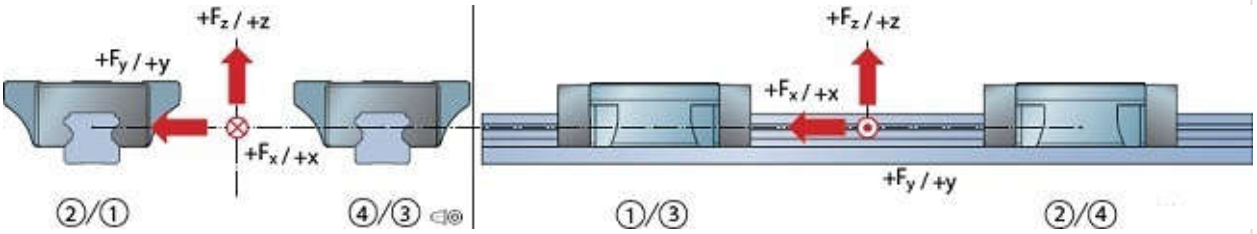
Title: Projeto EMMA
Comments: Cálculo de dimensionamento do trilho
Name: Estevão Ferrão
Company: LEAD | COPPE/UFRJ

Configure carriage

Linear guide system type: Two rail guides with four guide carriages
Distance between the carriages (C): 425 mm
Distance between the rails (D): 425 mm



Phase name	Stroke *mm*	% of stroke	f_d	Forces
Carregamento_Max	0.0	0.0	1.0	3



Load input for Carregamento_Max:

	Name	Force X	Force Y	Force Z	Lever arm x	Lever arm y	Lever arm z
Load 1:	Forcas	9025.0	9025.0	5885.0	0.0	0.0	1300.0
Load 2:	Mv	4120.0	4120.0	0.0	0.0	0.0	1000.0
Load 3:	Mh	4120.0	4120.0	0.0	1000.0	1000.0	0.0

Load result

Load result for Carregamento_Max:

Resulting load in Y-direction:	**Carriage 1** *N*	**Carriage 2** *N*	**Carriage 3** *N*	**Carriage 4** *N*
From X-direction:	-4 847,1	4 847,1	-4 847,1	4 847,1
From Y-direction:	9 163,3	-530,8	9 163,3	-530,8
Result in Y-direction:	4 316,3	4 316,2	4 316,3	4 316,2
Resulting load in Z-direction:				
From X-direction:	-18 650	18 650	-18 650	18 650
From Y-direction:	18 650	18 650	-18 650	-18 650
From Z-direction:	1 471,2	1 471,2	1 471,2	1 471,2
Result in Z-direction:	1 471,2	38 771,2	-35 828,8	1 471,2
Resulting carriage loads:				
Result load Y+Z:	5 787,5	43 087,5	40 145	5 787,5

Life influence factors c_1, c_2 and preload

Factor of reliability (c_1): 90%, c_1 = 1.00

Factor of operational conditions (c_2): 1.00

Preload class: T1

Life influence factors f_i and f_s

Designation	f_i	f_s
LLTHS 30 LU	1.0	0.23
LLTHS 30 LA	1.0	0.23
LLTHS 30 LR	1.0	0.23
LLTHS 35 U	1.0	0.23
LLTHS 35 A	1.0	0.23
LLTHS 35 R	1.0	0.23
LLTHS 35 LU	1.0	0.23
LLTHS 35 LA	1.0	0.23
LLTHS 35 LR	1.0	0.23
LLTHS 45 U	1.0	0.23
LLTHS 45 A	1.0	0.23
LLTHS 45 R	1.0	0.23
LLTHS 45 LU	1.0	0.23
LLTHS 45 LA	1.0	0.23
LLTHS 45 LR	1.0	0.23

F_{tot} per carriage

Designation		Carriage 1	Carriage 2	Carriage 3	Carriage 4
		N	*N*	*N*	*N*
LLTHS 30 LU	T1	?	?	?	?
LLTHS 30 LA	T1	?	?	?	?
LLTHS 30 LR	T1	?	?	?	?
LLTHS 35 U	T1	?	?	?	?
LLTHS 35 A	T1	?	?	?	?
LLTHS 35 R	T1	?	?	?	?
LLTHS 35 LU	T1	?	?	?	?
LLTHS 35 LA	T1	?	?	?	?
LLTHS 35 LR	T1	?	?	?	?
LLTHS 45 U	T1	?	?	?	?
LLTHS 45 A	T1	?	?	?	?
LLTHS 45 R	T1	?	?	?	?
LLTHS 45 LU	T1	?	?	?	?
LLTHS 45 LA	T1	?	?	?	?
LLTHS 45 LR	T1	?	?	?	?

Result

Designation		Length	Width	Height	Rail width	L_{ns}	C	C_0	Safety factor
		mm	*mm*	*mm*	*mm*	*km*	*N*	*N*	
LLTHS 30 LU	T1	125.4	60	42	28	NaN	33900	60800	1,4
LLTHS 30 LA	T1	125.4	90	42	28	NaN	33900	60800	1,4
LLTHS 30 LR	T1	125.4	60	45	28	NaN	33900	60800	1,4
LLTHS 35 U	T1	114.4	70	48	34	NaN	34700	54650	1,3
LLTHS 35 A	T1	114.4	100	48	34	NaN	34700	54650	1,3
LLTHS 35 R	T1	114.4	70	55	34	NaN	34700	54650	1,3
LLTHS 35 LU	T1	142.9	70	48	34	NaN	45000	79400	1,8
LLTHS 35 LA	T1	142.9	100	48	34	NaN	45000	79400	1,8
LLTHS 35 LR	T1	142.9	70	55	34	NaN	45000	79400	1,8
LLTHS 45 U	T1	136.5	86	60	45	NaN	59200	91100	2,1
LLTHS 45 A	T1	136.5	120	60	45	NaN	59200	91100	2,1
LLTHS 45 R	T1	136.5	86	70	45	NaN	59200	91100	2,1
LLTHS 45 LU	T1	168.5	86	60	45	NaN	72400	121400	2,8
LLTHS 45 LA	T1	168.5	120	60	45	NaN	72400	121400	2,8
LLTHS 45 LR	T1	168.5	86	70	45	NaN	72400	121400	2,8

Prerequisites on the design of the linear system

- Adjacent support structure is rigid.
- Rail tracks and carriages are form-fit mounted at datum planes.
- Sliding of components is not possible.
- Strength of attachment screws should be checked separately.
- No system friction considered.
- Lubrication, temperature and vibration are to be considered by the user during calculation.

Disclaimer

Version 2.6.3 **Release Date** 2015-12-06