

Elevator calculation acc. EN81-20/50

Elevator data

Nominal load	Q	kg	1600	
Car weight	F	kg	1800	(1430 - 2710kg)
Counterweight	G	kg	2600	(50%)
Travelling speed	v	(V_3=)	m/s	1,60
Travel distance	H	m	45,0	
Suspension / (roping)	is			2 : 1
Machine at the top, above				
Shaft efficiency	etaS	%	82	
Number of pulleys	(ball bearing)		3	
Type of rope	WOLF PAWO F7			
Number of ropes	z		9	
Rope diameter	ds	mm	8	
Rope weight	s	kg	104	(0,258 kg/m)
Compensation rope weight	su	kg	209	
Car cable weight	HK	kg	22	
Rope span weight	R	kg	0	
Min. rope breaking load	B	N	40600	
Traction sheave diameter	Dtr	mm	320	
Sheave width		mm	150	(number of grooves
10)				
Groove distance		mm	14,0	Minimum distance
Angle of wrap minimum	min.	deg	180	
V-groove angle		deg	50	

Sheave profile: V-groove with min. 50 HRC

Traction, rope pressure, rope safety

Traction empty, on top, accelerating
 1,8390 <= 1,9523
 Traction 150% nominal load, below, not moving
 1,5696 <= 1,9523
 Rope pressure k < permissible rope pressure
 1,83 < 2,00 N/mm²

Conditions according to EN81-1 or -20:
 Load 125% 1,4352 <= 2,1030 (2)
 Emergency stop 1,5571 <= 1,7562 (2)
 with deceleration [m/s²] 0,500
 Blocked car 12,001 > 4,4226 (4)

Real safety factor > Minimum safety factor for ropes
 20,51 > 12

Rope safety factor according to EN81-1 or -20:
 NEQUIV = 07,0 NEQUIVT = 05,0 NEQUIVP = 02,0
 Pulleys >= 320 mm, pulleys NPR = 0 NPS = 2
 Rope safety nue = 20,5 > 16,4 (minSF)
 Rope certification EN81

Traction conditions are fulfilled.

Rope safety conditions are fulfilled.

ZAlift - 20170315 - Machine dimensioning ZA-145539

Mechanical drive data

Machine manufactured by Ziehl-Abegg

Machine type SM 210.60 Gearless synchronous

Machine version ZAtop *

Traction sheave mm 320
/150/14,0/10x8/HK50

Load output torque Nm 782 (max. 1000)

Real statical axle load kg 3220 (max. 4500)

Rope pull admissible only in direction of motor foot!

Brake data

brake Mayr ROBA-twinstop 1000, 2x1200 Nm, EU-BD 1014

Dual circuit disk brake, DC supply necessary

(646 Nm, 1,03 m/s², 2 m, 24561 J, 316 W)

207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power kW 12,2

Typ. operating current 39,1 A, Start. Current 66,9 A at acceleration 0,80 m/s²

Start. Current 63,3 A at acceleration 0.7 m/s²

Average power losses 2,31 kW = 8298,7 kJ/h

Output speed rpm 191

Load torque Nm 782,6 (eff. 612,1)

Inertia of installation kgm² 42,41

240 Starts per hour, 50 % required duty cycle at elevator operation

Max. static load pulleys 27557 N, pulley speed 1,60 m/s

Selected ZIEHL-ABEGG motor

Motor type SM210.60-20 - gearless

	Nameplate data	(Operating
data)		
Rated voltage	V 360	
Rated frequency	Hz 32	(31,8)
Rated torque	Nm 850	(782,6)
Rated speed	rpm 192	(191,0)
Rated output power	kW 17,1	(15,7)
Rated current	A 42,5	(39,1)
Maximum torque	Nm 1450	(1450)
Current at maximum torque	A 83	(83)
Inertia of motor	kgm ² 0,500	
Possible acceleration	m/s ² 1,24	
(MKmax=630,0 Nm)		
Cooling FB020-4EW.W6.A5 (1~230V_30W)	(69)	
Dimension sheet A-M-6670, Motor construction type IMB3		

Motor with encoder ECN 1313-2048Endat

Selected frequency inverter

Inverter ZAdyn 4CS040, Rated inverter current 40 A
mains current 27,9 A, 400 V, 18,4 kW, Max. 0,94 m/s²
Radio interference filter, integrated ; Line reactor, integrated
Brake resistance separate BR50-3 (or Recuperation: ZArec4C 026 + BR14A)