

Elevator calculation acc. EN81-1

Elevator data

Nominal load	Q	kg	1600	
Car weight	F	kg	1800	(1710 - 2274kg)
Counterweight	G	kg	2600	(50%)
Travelling speed	v	(V_3=) m/s	1.00	
Travel distance	H	m	30.0	
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		10	
Rope diameter	ds	mm	8	
Rope weight	s	kg	77	(0.258 kg/m)
Compensation rope weight	su	kg	0	
Car cable weight	HK	kg	15	
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	
Undercutangle		deg	100	
Undercutwidth	b	mm	6.13	
Groove angle		deg	30	
Sheave profile:				circular undercut groove

Traction, rope pressure, rope safety

Traction empty, on top, accelerating (1.18)
 1.7873 <= 1.9023
 Traction 150% nominal load, below, not moving
 1.6749 <= 1.9023
 Rope pressure k < permissible rope pressure
 8.51 < 9.00 N/mm²

Conditions according to EN81-1 or -20:
 Load 125% 1.5211 <= 1.9110 (1)
 Emergency stop 1.6854 <= 1.7154 (4)
 with deceleration [m/s²] 0.500
 Blocked car 14.475 > 3.6518 (4)

Real safety factor > Minimum safety factor for ropes
 23.28 > 12
 Rope safety factor according to EN81-1 or -20:
 NEQUIV = 13.0 NEQUIVT = 10.0 NEQUIVP = 03.0
 Pulleys >= 320 mm, pulleys NPR = 0 NPS = 3
 Rope safety nue = 23.3 > 20.5 (minSF)
 Rope certification EN81

Traction conditions are fulfilled.
 Rope safety conditions are fulfilled.

ZAlift - 20161219 - Machine dimensioning d3293120

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/U100		
Load output torque	Nm	908 (max. 1000)
Real statical axle load	kg	3084 (max. 4500)

Rope pull admissible only in direction of motor foot!

Brake data

brake Mayr ROBA-twinstop 1000, 2x1200 Nm, EU-BD 1014/1
Dual circuit disk brake, DC supply necessary
(749 Nm, 0.88 m/s², 1 m, 11246 J, 316 W)
2 x 1200 Nm 207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power	kW	7.8
Typ. operating current 30.6 A, Start. Current	44.4 A at acceleration	0.60 m/s ²
Start. Current	46.7 A at acceleration	0.7 m/s ²
Average power losses	1.67 kW = 6020.82 kJ/h	
Output speed	rpm	119
Load torque	Nm	908.5 (eff. 626.7)
Inertia of installation	kgm ²	40.38

240 Starts per hour, 40 % required duty cycle at elevator operation
Max. static load pulleys 25507 N, pulley speed 1.00 m/s

Selected ZIEHL-ABEGG motor

Motor type SM210.60-20 - gearless

	Nameplate data	(Operating
data)		
Rated voltage	V	360
Rated frequency	Hz	20 (19.9)
Rated torque	Nm	850 (908.5)
Rated speed	rpm	120 (119.4)
Rated output power	kW	10.7 (11.4)
Rated current	A	28 (30.6)
Maximum torque	Nm	1450 (1450)
Current at maximum torque	A	55 (55)
Inertia of motor	kgm ²	0.500
Possible acceleration	m/s ²	1.06
(MKmax=630.0 Nm)		
Without cooling	(80)	
Dimension sheet A-M-6670, Motor construction type IMB3		
Motor with encoder ECN 1313-2048Endat		

Selected frequency inverter

Inverter ZAdyn 4CS032, Rated inverter current 32 A
mains current 22.3 A, 400 V, 14.7 kW, Max. 1.06 m/s²
Radio interference filter, integrated ; Line reactor, integrated

Brake resistance separate BR25-3 (or Recuperation: ZArec4C 026 + BR25-3)

ASACOD.ir - 02144340048