

Elevator calculation acc. EN81-1

**Elevator data**

Nominal load	Q	kg	1600	
Car weight	F	kg	1800	(1739 - 2274kg)
Counterweight	G	kg	2600	(50%)
Travelling speed	v	(V_3=) m/s	1.60	
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	77	
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  
 1.7862 <= 1.9023  
 Traction 150% nominal load, below, not moving  
 1.6265 <= 1.9023  
 Rope pressure k < permissible rope pressure  
 8.51 < 9.00 N/mm<sup>2</sup>

Conditions according to EN81-1 or -20:  
 Load 125% 1.4771 <= 1.9110 (1)  
 Emergency stop 1.6165 <= 1.6333 (4)  
 with deceleration [m/s<sup>2</sup>] 0.500  
 Blocked car 15.092 > 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 d3293123

### 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	834 (max. 1000)
Real statical axle load	kg	3123 (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  
(689 Nm, 0.99 m/s<sup>2</sup>, 2 m, 25677 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	12.4
Typ. operating current	41.7 A, Start. Current	69.4 A at acceleration 0.80 m/s <sup>2</sup>
Start. Current		65.9 A at acceleration 0.7 m/s <sup>2</sup>
Average power losses	2.46 kW = 8852.4 kJ/h	
Output speed	rpm	191
Load torque	Nm	834.8 (eff. 617.7)
Inertia of installation	kgm <sup>2</sup>	40.87

240 Starts per hour , 50 % required duty cycle at elevator operation  
Max. static load pulleys 26264 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 ( 834.8)
Rated speed	rpm	192 ( 191.0)
Rated output power	kW	17.1 ( 16.7)
Rated current	A	42.5 ( 41.7)
Maximum torque	Nm	1450 ( 1450 )
Current at maximum torque	A	83 ( 83 )
Inertia of motor	kgm <sup>2</sup>	0.500
Possible acceleration	m/s <sup>2</sup>	1.19
(MKmax=630.0 Nm)		
Cooling	FB020-4EW.W6.A5 (1~230V_30W)	(70)
Dimension sheet	A-M-6670, Motor construction type	IMB3
Motor with encoder	ECN 1313-2048Endat	

### Selected frequency inverter

Inverter ZAdyn 4CS050, Rated inverter current 50 A  
mains current 30.0 A, 400 V, 19.7 kW, Max. 1.19 m/s<sup>2</sup>  
Radio interference filter, integrated ; Line reactor, integrated

Brake resistance separate BR50-3 (or Recuperation: ZArec4C 026 + BR25-3)

ASACOD.ir - 02144340048