

Elevator calculation acc. EN81-1

Item 806

**Elevator data**

Nominal load	Q	kg	600	
Car weight	F	kg	800	(790 - 1166kg)
Counterweight	G	kg	1100	(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		6	
Rope diameter	ds	mm	8	
Rope weight	s	kg	46	(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	110	(number of grooves

6)

Groove distance		mm	17.0	Standard
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 (1.23)  
1.7959 <= 1.9023  
Traction 150% nominal load, below, not moving  
1.6299 <= 1.9023  
Rope pressure k < permissible rope pressure  
5.96 < 9.00 N/mm<sup>2</sup>

Conditions according to EN81-1 or -20:  
Load 125% 1.4935 <= 1.9110 (1)  
Emergency stop 1.6270 <= 1.6333 (4)  
with deceleration [m/s<sup>2</sup>] 0.500  
Blocked car 10.833 > 3.6518 (4)

Real safety factor > Minimum safety factor for ropes  
33.27 > 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 = 33.3 > 20.5 (minSF)  
Rope certification EN81

Traction conditions are fulfilled.  
Rope safety conditions are fulfilled.

## ZAlift - 20161219 - Machine dimensioning d3293874

### Mechanical drive data

Machine manufactured by Ziehl-Abegg  
Machine type SM 200.20C Gearless synchronous  
Machine version ZAtop \*

Traction sheave	mm	320
/110/17.0/6x8/U100		
Load output torque	Nm	373 (max. 396)
Real statical axle load	kg	1303 (max. 2440)

### Brake data

brake Mayr ROBA-twinstop 350, 2x410 Nm, EU-BD 845 (ABV845 + ESV845)  
Dual circuit disk brake, DC supply necessary  
(308 Nm, 0.47 m/s<sup>2</sup>, 4 m, 18503 J, 164 W)  
2 x 410 Nm 207 V brake, with hand release, microswitch

### Machine load data in the installation

Typical motor operating power	kW	4.4
Typ. operating current 23.1 A, Start. Current 39.4 A at acceleration 0.80 m/s <sup>2</sup>		
Start. Current 37.3 A at acceleration 0.7 m/s <sup>2</sup>		
Average power losses	1.1 kW = 3963.91 kJ/h	
Output speed	rpm	191
Load torque	Nm	373.8 (eff. 220.9)
Inertia of installation	kgm <sup>2</sup>	17.19
240 Starts per hour, 40 % required duty cycle at elevator operation		
Max. static load pulleys 10792 N, pulley speed 1.60 m/s		

### Selected ZIEHL-ABEGG motor

Motor type SM200.20C-20 - gearless

	Nameplate data	(Operating
data)		
Rated voltage	V	360
Rated frequency	Hz	32 ( 31.8)
Rated torque	Nm	330 ( 373.8)
Rated speed	rpm	192 ( 191.0)
Rated output power	kW	6.6 ( 7.5)
Rated current	A	19 ( 23.1)
Maximum torque	Nm	570 ( 570 )
Current at maximum torque	A	41.5 ( 41.5)
Inertia of motor	kgm <sup>2</sup>	0.160
Possible acceleration	m/s <sup>2</sup>	0.90
(MKmax=280.0 Nm)		
Without cooling (79)		
Dimension sheet A-M-6686, Motor construction type IMB3		
Motor with encoder ECN 1313-2048Endat		

### Selected frequency inverter

Inverter ZAdyn 4CS023, Rated inverter current 23 A  
mains current 17.0 A, 400 V, 11.2 kW, Max. 0.90 m/s<sup>2</sup>  
Radio interference filter, integrated ; Line reactor, integrated

Brake resistance separate BR25-3 (or Recuperation: ZArec4C 013)

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