

Elevator calculation acc. EN81-1

Item 601

## Elevator data

Nominal load	Q	kg	450	
Car weight	F	kg	600	(521 - 1281kg)
Counterweight	G	kg	825	(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		4	
Rope diameter	ds	mm	8	
Rope weight	s	kg	30	(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	74	(number of grooves 4)
Groove distance		mm	17.0	Standard
Angle of wrap minimum	min.	deg	180	
Undercutangle		deg	95	
Undercutwidth	b	mm	5.90	
Groove angle		deg	30	

Sheave profile: circular undercut groove

## Traction, rope pressure, rope safety

Traction empty, on top, accelerating (1.18)  
1.6982 <= 1.8399

Traction 150% nominal load, below, not moving  
1.6205 <= 1.8399

Rope pressure k < permissible rope pressure  
5.91 < 9.00 N/mm<sup>2</sup>

Conditions according to EN81-1 or -20:

Load 125% 1.4841 <= 1.8582 (1)

Emergency stop 1.6025 <= 1.6759 (4)

with deceleration [m/s<sup>2</sup>] 0.500

Blocked car 12.262 > 3.4528 (4)

Real safety factor > Minimum safety factor for ropes  
29.78 > 12

Rope safety factor according to EN81-1 or -20:  
NEQUIV = 09.7 NEQUIVT = 06.7 NEQUIVP = 03.0

Pulleys >= 320 mm, pulleys NPR = 0 NPS = 3

Rope safety nue = 29.8 > 18.5 (minSF)

Rope certification EN81

Traction conditions are fulfilled.  
Rope safety conditions are fulfilled.

### Mechanical drive data

Machine manufactured by Ziehl-Abegg

Machine type SM 200.15C Gearless synchronous

Machine version ZAtop \*

Traction sheave mm 320 /74/17.0/4x8/U95

Load output torque Nm 273 (max. 300)

Real statical axle load kg 975 (max. 1850)

### Brake data

brake Mayr ROBA-twinstop 250, 2x280 Nm, EU-BD 845 (ABV845 + ESV845)

Dual circuit disk brake, DC supply necessary

(225 Nm, 0.34 m/s<sup>2</sup>, 2 m, 6813 J, 158 W)

2 x 280 Nm 207 V brake, with hand release, microswitch

### Machine load data in the installation

Typical motor operating power kW 2.0

Typ. operating current 15.4 A, Start. Current 23.2 A at acceleration 0.60 m/s<sup>2</sup>

Start. Current 24.5 A at acceleration 0.7 m/s<sup>2</sup>

Average power losses 0.5 kW = 1809.27 kJ/h

Output speed rpm 119

Load torque Nm 273.0 (eff. 156.0)

Inertia of installation kgm<sup>2</sup> 12.79

240 Starts per hour, 40 % required duty cycle at elevator operation

Max. static load pulleys 8092 N, pulley speed 1.00 m/s

### Selected ZIEHL-ABEGG motor

Motor type SM200.15C-20 - gearless

	Nameplate data		(Operating data)	
Rated voltage	V	360		
Rated frequency	Hz	28	(	19.9)
Rated torque	Nm	250	(	273.0)
Rated speed	rpm	168	(	119.4)
Rated output power	kW	4.4	(	3.4)
Rated current	A	13.5	(	15.4)
Maximum torque	Nm	430	(	430)
Current at maximum torque	A	28	(	28)
Inertia of motor	kgm <sup>2</sup>	0.120		
Possible acceleration	m/s <sup>2</sup>	0.97		

(MKmax=210.0 Nm)

Without cooling (64)

Dimension sheet A-M-6686, Motor construction type IMB3

Motor with encoder ECN 1313-2048Endat

### Selected frequency inverter

Inverter ZAdyn 4CS017, Rated inverter current 17 A

mains current 9.3 A, 400 V, 6.1 kW, Max. 0.97 m/s<sup>2</sup>

Radio interference filter, integrated ; Line reactor, integrated

Brake resistance separate BR17-3 (or Recuperation: ZArec4C 013)