

Elevator calculation acc. EN81-1

Item 1004

Elevator data

Nominal load	Q	kg	750	
Car weight	F	kg	1000	(948 - 1574kg)
Counterweight	G	kg	1375	(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)
1.7745 <= 1.9023Traction 150% nominal load, below, not moving
1.6130 <= 1.9023Rope pressure k < permissible rope pressure
7.35 < 9.00 N/mm²

Conditions according to EN81-1 or -20:

Load 125% 1.4766 <= 1.9110 (1)

Emergency stop 1.6064 <= 1.6333 (4)

with deceleration [m/s²] 0.500

Blocked car 13.491 > 3.6518 (4)

Real safety factor > Minimum safety factor for ropes
26.95 > 12Rope 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 = 26.9 > 20.5 (minSF)

Rope certification EN81

Traction conditions are fulfilled.

Rope safety conditions are fulfilled.

Mechanical drive data

Machine manufactured by Ziehl-Abegg

Machine type SM 200.30C Gearless synchronous

Machine version ZAtop *

Traction sheave	mm	320 /110/17.0/6x8/U100
Load output torque	Nm	445 (max. 499)
Real statical axle load	kg	1616 (max. 2440)

Brake data

brake Mayr ROBA-stop-R 400, 2x500 Nm, EU-BD 766 (ABV766/2 + ESV766/1)

Dual circuit disk brake, DC supply necessary

(367 Nm, 0.50 m/s², 3 m, 21336 J, 184 W)

2 x 500 Nm 207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power	kW	5.6
Typ. operating current 23.0 A, Start. Current	38.1 A at acceleration 0.80 m/s ²	
Start. Current	36.2 A at acceleration 0.7 m/s ²	
Average power losses	1.31 kW = 4720.61 kJ/h	
Output speed	rpm	191
Load torque	Nm	445.2 (eff. 279.0)
Inertia of installation	kgm ²	21.19
240 Starts per hour , 50 % required duty cycle at elevator operation		
Max. static load pulleys 13490 N, pulley speed 1.60 m/s		

Selected ZIEHL-ABEGG motor

Motor type SM200.30C-20 - gearless

	Nameplate data	(Operating data)
Rated voltage	V	360
Rated frequency	Hz	32 (31.8)
Rated torque	Nm	475 (445.2)
Rated speed	rpm	192 (191.0)
Rated output power	kW	9.6 (8.9)
Rated current	A	24.5 (23.0)
Maximum torque	Nm	820 (820)
Current at maximum torque	A	50 (50)
Inertia of motor	kgm ²	0.240
Possible acceleration	m/s ²	1.40

(MKmax=450.0 Nm)

Without cooling (70)

Dimension sheet A-M-6687, Motor construction type IMB3

Motor with encoder ECN 1313-2048Endat

Selected frequency inverter

Inverter ZAdyn 4CS032, Rated inverter current 32 A

mains current 17.5 A, 400 V, 11.5 kW, Max. 1.40 m/s²

Radio interference filter, integrated ; Line reactor, integrated

Brake resistance separate BR25-3 (or Recuperation: ZAreC4C 013)