

Elevator calculation acc. EN81-1

Item 1001

Elevator data

Nominal load	Q	kg	750
Car weight	F	kg	950 (876 - 1824kg)
Counterweight	G	kg	1325 (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		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	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)
 $1.7302 \leq 1.8399$
 Traction 150% nominal load, below, not moving
 $1.6361 \leq 1.8399$
 Rope pressure $k <$ permissible rope pressure
 $6.35 < 9.00 \text{ N/mm}^2$

Conditions according to EN81-1 or -20:
 Load 125% $1.4946 \leq 1.8582$ (1)
 Emergency stop $1.6323 \leq 1.6759$ (4)
 with deceleration $[m/s^2] 0.500$
 Blocked car $12.827 > 3.4528$ (4)

Real safety factor $>$ Minimum safety factor for ropes
 $27.70 > 12$

Rope safety factor according to EN81-1 or -20:
 NEQUIV = 09.7 NEQUIVT = 06.7 NEQUIVP = 03.0
 Pulleys $\geq 320 \text{ mm}$, pulleys NPR = 0 NPS = 3
 Rope safety $nue = 27.7 > 18.5$ (minSF)
 Rope certification EN81

Traction conditions are fulfilled.
 Rope safety conditions are fulfilled.

Mechanical drive data

Machine manufactured by Ziehl-Abegg

Machine type SM 200.30C Gearless synchronous

Machine version ZAtop *

Traction sheave	mm	320 /110/17.0/6x8/U95
Load output torque	Nm	445 (max. 499)
Real statical axle load	kg	1566 (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, 0.51 m/s², 1 m, 8086 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	3.5
Typ. operating current	15.9 A, Start. Current	23.6 A at acceleration 0.60 m/s ²
Start. Current		24.9 A at acceleration 0.7 m/s ²
Average power losses		0.82 kW = 2950.38 kJ/h
Output speed	rpm	119
Load torque	Nm	445.2 (eff. 279.0)
Inertia of installation	kgm ²	20.55

240 Starts per hour , 50 % required duty cycle at elevator operation
 Max. static load pulleys 12999 N, pulley speed 1.00 m/s

Selected ZIEHL-ABEGG motor

Motor type SM200.30C-20 - gearless

	Nameplate data		(Operating data)
Rated voltage	V	360	
Rated frequency	Hz	20	(19.9)
Rated torque	Nm	475	(445.2)
Rated speed	rpm	120	(119.4)
Rated output power	kW	6	(5.6)
Rated current	A	17	(15.9)
Maximum torque	Nm	820	(820)
Current at maximum torque	A	35	(35)
Inertia of motor	kgm ²	0.240	
Possible acceleration	m/s ²	1.44	

(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 4CS017, Rated inverter current 17 A
 mains current 12.3 A, 400 V, 8.1 kW, Max. 1.12 m/s²
 Radio interference filter, integrated ; Line reactor, integrated
 Brake resistance separate BR17-3 (or Recuperation: ZRec4C 013)