

Elevator calculation acc. EN81

Elevator data

Nominal load	Q	kg	1000	
Car weight	F	kg	1200	(1151 - 2028kg)
Counterweight	G	kg	1700	(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		7	
Rope diameter	ds	mm	8	
Rope weight	s	kg	54	(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	122	(number of grooves 7)
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)
1.7527 <= 1.8399

Traction 150% nominal load, below, not moving
1.6520 <= 1.8399

Rope pressure k < permissible rope pressure
7.01 < 9.00 N/mm²

Conditions according to EN81-1 or -20:

Load 125% 1.5049 <= 1.8582 (1)

Emergency stop 1.6530 <= 1.6759 (4)

with deceleration [m/s²] 0.500

Blocked car 13.843 > 3.4528 (4)

Real safety factor > Minimum safety factor for ropes
25.10 > 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 = 25.1 > 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 200.40D Gearless synchronous

Machine version ZAtop *

Traction sheave	mm	320 /122/17.0/7x8/U95
Load output torque	Nm	578 (max. 660)
Real statical axle load	kg	2011 (max. 3600)

Brake data

brake Warner ERS VAR07 SZ800/800, 2x800 Nm, EU-BD 819/2

Dual circuit disk brake, DC supply necessary

(477 Nm, 0.97 m/s², 1 m, 6830 J, 264 W)

207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power	kW	4.8
Typ. operating current 19.3 A, Start. Current	28.0 A at acceleration 0.60 m/s ²	
Start. Current	29.5 A at acceleration 0.7 m/s ²	
Average power losses	1.07 kW = 3836.23 kJ/h	
Output speed	rpm	119
Load torque	Nm	578.8 (eff. 380.4)
Inertia of installation	kgm ²	26.34
240 Starts per hour , 50 % required duty cycle at elevator operation		
Max. static load pulleys 16678 N, pulley speed 1.00 m/s		

Selected ZIEHL-ABEGG motor

Motor type SM200.40D-20 - gearless

	Nameplate data		(Operating data)
Rated voltage	V	360	
Rated frequency	Hz	20	(19.9)
Rated torque	Nm	600	(578.8)
Rated speed	rpm	120	(119.4)
Rated output power	kW	7.5	(7.2)
Rated current	A	20	(19.3)
Maximum torque	Nm	1000	(1000)
Current at maximum torque	A	38	(38)
Inertia of motor	kgm ²	0.310	
Possible acceleration	m/s ²	1.26	

(MKmax=400.0 Nm)

Without cooling (68)

Dimension sheet A-M-6665, Motor construction type IMB3

Motor with encoder ECN 1313-2048Endat

Selected frequency inverter

Inverter ZAdyn 4CS023, Rated inverter current 23 A

mains current 14.6 A, 400 V, 9.6 kW, Max. 1.26 m/s²

Radio interference filter, integrated ; Line reactor, integrated

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