ZIEHL-ABEGG SE
Künzelsau, Germany

Elevator calculation acc. EN81 d32 Date: 16/11/2017

Elevator data

Nominal load	Q		kg	1200
Car weight	F		kg	1400 (1220 - 2631kg)
Counterweight	G		kg	2000 (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			8
Rope diameter	ds		mm	8
Rope weight	s		kg	61 (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 8)
Groove distance			mm	14.0 Minimum distance
Angle of wrap minimum		min.	deg	180
V-groove angle			deg	45

Sheave profile: V-groove with min. 50 HRC

Traction, rope pressure, rope safety

Traction empty,on top, accelerating (1.33)
1.9963 <= 2.0935
Traction 150% nominal load, below, not moving
1.6619 <= 2.0935
Rope pressure k < permissible rope pressure
1.70 < 2.00 N/mm²

Conditions according to EN81-1 or -20:
Load 125% 1.5119 <= 2.2726 (1)
Emergency stop 1.6669 <= 1.8625 (4)
with deceleration [m/s²]0.500
Blocked car 14.106 > 5.1648 (4)

Real safety factor > Minimum safety factor for ropes
24.31 > 12
Rope safety factor according to EN81-1 or -20:
NEQUIV = 07.0 NEQUIVT = 04.0 NEQUIVP = 03.0
Pulleys >= 320 mm, pulleys NPR = 0 NPS = 3
Rope safety nue = 24.3 > 16.4 (minSF)
Rope certification EN81

Traction conditions are fulfilled.
Rope safety conditions are fulfilled.

ZAlift - 20171013 - Machine dimensioning d3293960

Mechanical drive data

Machine manufactured by Ziehl-Abegg
Machine type SM 200.45D Gearless synchronous
Machine version ZAtop *

Traction sheave	mm	320 /122/14.0/8x8/HK45
Load output torque	Nm	688 (max. 799)
Real statical axle load	kg	2369 (max. 3600)

Brake data

brake Warner ERS VAR07 SZ800/800, 2x800 Nm, EU-BD 819/2
Dual circuit disk brake, DC supply necessary
(568 Nm, 0.59 m/s², 3 m, 28622 J, 264 W)
207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power	kW	9.2
Typ. operating current 34.9 A, Start. Current		58.7 A at acceleration 0.80 m/s²
Start. Current		55.6 A at acceleration 0.7 m/s²
Average power losses		2.03 kW = 7303.08 kJ/h
Output speed	rpm	191
Load torque	Nm	688.7(eff. 462.4)
Inertia of installation	kgm²	31.02

240 Starts per hour , 50 % required duty cycle at elevator operation
Max. static load pulleys 19621 N, pulley speed 1.60 m/s

Selected ZIEHL-ABEGG motor

Motor type SM200.45D-20 - gearless

		Nameplate data	(Operating data)
Rated voltage	V	360	
Rated frequency	Hz	32	(31.8)
Rated torque	Nm	710	(688.7)
Rated speed	rpm	192	(191.0)
Rated output power	kW	14.3	(13.8)
Rated current	A	36	(34.9)
Maximum torque	Nm	1200	(1200)
Current at maximum torque	A	74	(74)
Inertia of motor	kgm²	0.350	
Possible accelleration	m/s²	1.30	

(MKmax=480.0 Nm)
Without cooling (80)
Dimension sheet A-M-6665, Motor construction type IMB3
Motor with encoder ECN 1313-2048Endat

Selected frequency inverter

Inverter ZAdyn 4CS040, Rated inverter current 40 A
mains current 25.8 A, 400 V, 17.0 kW, Max. 1.24 m/s²
Radio interference filter, integrated ; Line reactor, integrated
Brake resistance separate BR50-3 (or Recuperation: ZArec4C 026 + BR14A)