ZAlift - 20190505 - calculation ZAL-161229

ZIEHL-ABEGG SE
Künzelsau, Germany

Elevator calculation acc. EN81-20/50 schuf Date: 09.05.2019

Elevator data

Nominal load	Q		kg	630
Car weight	F		kg	1200 (468 - 1650kg)
Counterweight	G		kg	1515 (50%)
Travelling speed	v	(V_3=)	m/s	1,60
Travel distance	H		m	70,0
Suspension / (roping)	is			2 : 1
Machine at the top, above				
Shaft efficiency	etaS		%	82
Number of pulleys	(ball bearing)			3
Type of rope	DRAKO 250 T			
Number of ropes	z			5
Rope diameter	ds		mm	8
Rope weight	s		kg	95 (0,273 kg/m)
Compensation rope weight	su		kg	181
Car cable weight	HK		kg	35
Rope span weight	R		kg	0
Min. rope breaking load	B		N	43300
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
V-groove angle			deg	50

Sheave profile: V-groove with min. 50 HRC

Traction, rope pressure, rope safety

Traction empty,on top, accelerating
1,6018 <= 1,9523
Traction 150% nominal load, below, not moving
1,3769 <= 1,9523
Rope pressure k < permissible rope pressure
1,86 < 2,00 N/mm²

Conditions according to EN81:
Load 125% 1,2919 <= 2,1030 (2)
Emergency stop 1,3607 <= 1,7562 (2)
with deceleration [m/s²]0,500
Blocked car 09,152 > 4,4226 (4)

Real safety factor > Minimum safety factor for ropes
21,57 > 12
Rope safety factor according to EN81:
NEQUIV = 07,0 NEQUIVT = 05,0 NEQUIVP = 02,0
Pulleys >= 320 mm, pulleys NPR = 0 NPS = 2
Rope safety nue = 21,6 > 16,4 (minSF)
Rope certification EN81

Traction conditions are fulfilled.
Rope safety conditions are fulfilled.

ZAlift - 20190505 - Machine dimensioning ZAL-161229

Mechanical drive data

Machine manufactured by Ziehl-Abegg
Machine type SM 200.20C Gearless synchronous
Machine version ZAtop *
Traction sheave mm 320
/110/17,0/6x8/HK50
Load output torque Nm 324 (max. 396)
Real statical axle load kg 1876 (max. 2575)

Brake data

brake Mayr ROBA-twinstop 350, 2x410 Nm, EU-BD 845 (ABV845 + ESV845)
Dual circuit disk brake, DC supply necessary
(267 Nm, 0,45 m/s², 4 m, 19125 J, 164 W)
207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power kW 4,3
Typ. operating current 18,7 A, Start. Current 41,5 A at acceleration 0,78
m/s²
Start. Current 39,1 A at acceleration 0,7
m/s²
Average power losses 0,95 kW = 3435,83 kJ/h
Output speed rpm 191
Load torque Nm 324,0(eff. 213,9)
Inertia of installation kgm² 25,01
240 Starts per hour , 60 % required duty cycle at elevator operation
Max. static load pulleys 16645 N, pulley speed 1,60 m/s

Selected ZIEHL-ABEGG motor

Motor type SM200.20C-20 - gearless

		Nameplate data	(Operating data)
Rated voltage	V	360	
Rated frequency	Hz	32	(31,8)
Rated torque	Nm	330	(324,0)
Rated speed	rpm	192	(191,0)
Rated output power	kW	6,6	(6,5)
Rated current	A	19	(18,7)
Maximum torque	Nm	570	(570)
Current at maximum torque	A	41,5	(41,5)
Inertia of motor	kgm²	0,160	
Possible accelleration	m/s²	0,78	

(MKmax=280,0 Nm)
Cooling 2 x SF23092A (1~230V_15W) (74)
Dimension sheet A-M-6716, Motor construction type IMB3
Motor with encoder ECN 1313-2048Endat

Selected frequency inverter

Inverter not from ZIEHL-ABEGG
Rated inverter current >= 19 A