

ZAlift - 20220211 - calculation f5792042

ZIEHL-ABEGG SE  
Künzelsau, Germany

Elevator calculation acc. EN81

f57 4/18/2022

**Elevator data**

Nominal load	Q	kg	1600
Car weight	F	kg	1800 (1762 - 2393kg)
Counterweight	G	kg	2600 (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 , without deflection pulley			
Shaft efficiency	etaS	%	82
Number of pulleys (ball bearing)			3
Type of rope			WOLF PAWO F7
Number of ropes	z		10
Rope diameter	ds	mm	8
Rope weight	s	kg	77 (0.258 kg/m)
Compensation rope weight	su	kg	77
Car cable weight	HK	kg	8
Rope span weight	R	kg	0
Min. rope breaking load	B	N	40600
Traction sheave diameter	Dtr	mm	320
Sheave width		mm	150 number of grooves (10)
Groove distance		mm	14.0 Minimum distance
Angle of wrap minimum	min. deg		180
Undercut angle	deg		100
Undercut width	b	mm	6.13
Groove angle	deg		30
Sheave profile: circular undercut groove			

**Traction, rope pressure, rope safety**

Traction empty, on top, accelerating  
1.7931 <= 1.9023

Traction 150% nominal load, below, not moving  
1.6267 <= 1.9023

Rope pressure k < permissible rope pressure  
8.51 < 9.00 N/mm<sup>2</sup>

Conditions according to EN81:

Load 125% 1.4773 <= 1.9110 (1)

Emergency stop 1.6227 <= 1.6333 (4)

with deceleration [m/s<sup>2</sup>] 0.500

Blocked car 15.034 > 3.6518 (4)

Real safety factor > Minimum safety factor for ropes  
23.28 > 12

Rope safety factor according to EN81: (0), Basis 0

Pulleys >= 320 mm, pulleys NPR = 0 NPS = 2

Rope safety nue = 23.3 > 20.0 (minSF)

Rope certification EN81

Traction conditions are fulfilled.

Rope safety conditions are fulfilled.

**ZAlift - 20220211 - Machine dimensioning f5792042**

**Mechanical drive data**

Machine manufactured by Ziehl-Abegg

Machine type SM 210.60B Gearless synchronous

Machine version ZAtop \*

Traction sheave mm 320 /150/14.0/10x8/U100

Permissible load output torque Nm 835 (max. 1000)

Real statical axle load kg 3119 (max. 4500)

Rope pull admissible only in direction of motor foot!

-

**Brake data**

brake Mayr ROBA-twinstop RTW1000, 2x1200 Nm, EU-BD 1014

Dual circuit disc brake, DC supply necessary

(689 Nm, 0.99 m/s<sup>2</sup>, 2 m, 25691 J, 316 W)

207 V brake, with hand release, microswitch

-

**Machine load data in the installation**

Typical motor operating power kW 12.4

Typ. operating current 43.2 A, Start. Current 69.9 A at acceleration 0.80 m/s<sup>2</sup>

Start. Current 66.6 A at acceleration 0.7 m/s<sup>2</sup>

Average power losses 2.46 kW = 8856.44 kJ/h

Output speed rpm 191

Load torque Nm 835.2 (eff. 620.8)

Inertia of installation kgm<sup>2</sup> 40.87

240 Starts per hour , 40 % required duty cycle at elevator operation

Max. static load pulleys 26262 N, pulley speed 1.60 m/s

**Selected ZIEHL-ABEGG motor**

Motor type SM210.60B-20 - gearless

Nameplate data (Operating data)

Rated voltage	V	360	
Rated frequency	Hz	32	( 31.8)
Rated torque	Nm	850	( 835.2)
Rated speed	rpm	192	( 191.0)
Rated output power	kW	17.1	( 16.7)
Rated current	A	44	( 43.2)
Maximum torque	Nm	1450	( 1450 )
Current at maximum torque	A	83	( 83 )
Inertia of motor	kgm <sup>2</sup>	0.500	
Possible acceleration	m/s <sup>2</sup>	1.19	

(MKmax=630.0 Nm)

Without cooling [PTC] (85)

Dimension sheet A-M-6706, Motor construction type IMB3

Motor with encoder ECN 1313-2048Endat

**Selected frequency inverter**

Inverter ZAdyn 4CS040, Rated inverter current 40 A  
mains current 30.2 A, 400 V, 19.9 kW, Max. 0.86 m/s<sup>2</sup>

Radio interference filter, integrated ; Line reactor, integrated

Braking resistance BR50-3

Brake control module ohne

ASACOD