**ZAlift - 20161219 - calculation d3293872**

**ZIEHL-ABEGG SE**
**Künzelsau, Germany**

**Elevator calculation acc. EN81-1** **d32 Date: 12/10/2017**

Item 602

**Elevator data**

| | | | | |
|---|---|---|---|---|
| Nominal load | Q | | kg | 450 |
| Car weight | F | | kg | 600 (564 - 1066kg) |
| Counterweight | G | | kg | 825 (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 | | | 4 |
| Rope diameter | ds | | mm | 8 |
| Rope weight | s | | kg | 30 (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 | 74 (number of grooves 4) |
| Groove distance | | | mm | 17.0 Standard |
| Angle of wrap minimum | | min. | deg | 180 |
| Undercutangle | | | deg | 100 |
| Undercutwidth | b | | mm | 6.13 |
| Groove angle | | | deg | 30 |

Sheave profile: circular undercut groove

**Traction, rope pressure, rope safety**

Traction empty,on top, accelerating (1.23)
1.7695 <= 1.9023
Traction 150% nominal load, below, not moving
1.6205 <= 1.9023
Rope pressure k < permissible rope pressure
6.66 < 9.00 N/mm²

Conditions according to EN81-1 or -20:
Load 125% 1.4841 <= 1.9110 (1)
Emergency stop 1.6025 <= 1.6333 (4)
with deceleration [m/s²]0.500
Blocked car 12.262 > 3.6518 (4)

Real safety factor > Minimum safety factor for ropes
29.78 > 12
Rope safety factor according to EN81-1 or -20:
NEQUIV = 13.0 NEQUIVT = 10.0 NEQUIVP = 03.0
Pulleys >= 320 mm, pulleys NPR = 0 NPS = 3
Rope safety nue = 29.8 > 20.5 (minSF)
Rope certification EN81

Traction conditions are fulfilled.
Rope safety conditions are fulfilled.

**ZAlift - 20161219 - Machine dimensioning d3293872**

**Mechanical drive data**

Machine manufactured by Ziehl-Abegg
Machine type SM 200.15C Gearless synchronous
Machine version ZAtop *
Traction sheave mm 320
/74/17.0/4x8/U100
Load output torque Nm 273 (max. 300)
Real statical axle load kg 975 (max. 1850)

**Brake data**

brake Mayr ROBA-twinstop 250, 2x280 Nm, EU-BD 845 (ABV845 + ESV845)
Dual circuit disk brake, DC supply necessary
(225 Nm, 0.34 m/s², 5 m, 17441 J, 158 W)
2 x 280 Nm 207 V brake, with hand release, microswitch

**Machine load data in the installation**

Typical motor operating power kW 3.1
Typ. operating current 17.0 A, Start. Current 28.5 A at acceleration 0.80
m/s²
Start. Current 27.1 A at acceleration 0.7
m/s²
Average power losses 0.8 kW = 2894.84 kJ/h
Output speed rpm 191
Load torque Nm 273.0(eff. 156.0)
Inertia of installation kgm² 12.79
240 Starts per hour , 40 % required duty cycle at elevator operation
Max. static load pulleys 8094 N, pulley speed 1.60 m/s

**Selected ZIEHL-ABEGG motor**

Motor type SM200.15C-20 - gearless

| | | Nameplate data | (Operating data) |
|---|---|---|---|
| Rated voltage | V | 360 | |
| Rated frequency | Hz | 32 | ( 31.8) |
| Rated torque | Nm | 250 | ( 273.0) |
| Rated speed | rpm | 192 | ( 191.0) |
| Rated output power | kW | 5 | ( 5.5) |
| Rated current | A | 15 | ( 17.0) |
| Maximum torque | Nm | 430 | ( 430 ) |
| Current at maximum torque | A | 31 | ( 31 ) |
| Inertia of motor | kgm² | 0.120 | |
| Possible accelleration | m/s² | 0.97 | |

(MKmax=210.0 Nm)
Without cooling (64)
Dimension sheet A-M-6686, Motor construction type IMB3
Motor with encoder ECN 1313-2048Endat

**Selected frequency inverter**

Inverter ZAdyn 4CS017, Rated inverter current 17 A
mains current 12.7 A, 400 V, 8.3 kW, Max. 0.94 m/s²
Radio interference filter, integrated ; Line reactor, integrated

Brake resistance separate BR17-3 (or Recuperation: ZArec4C 013)