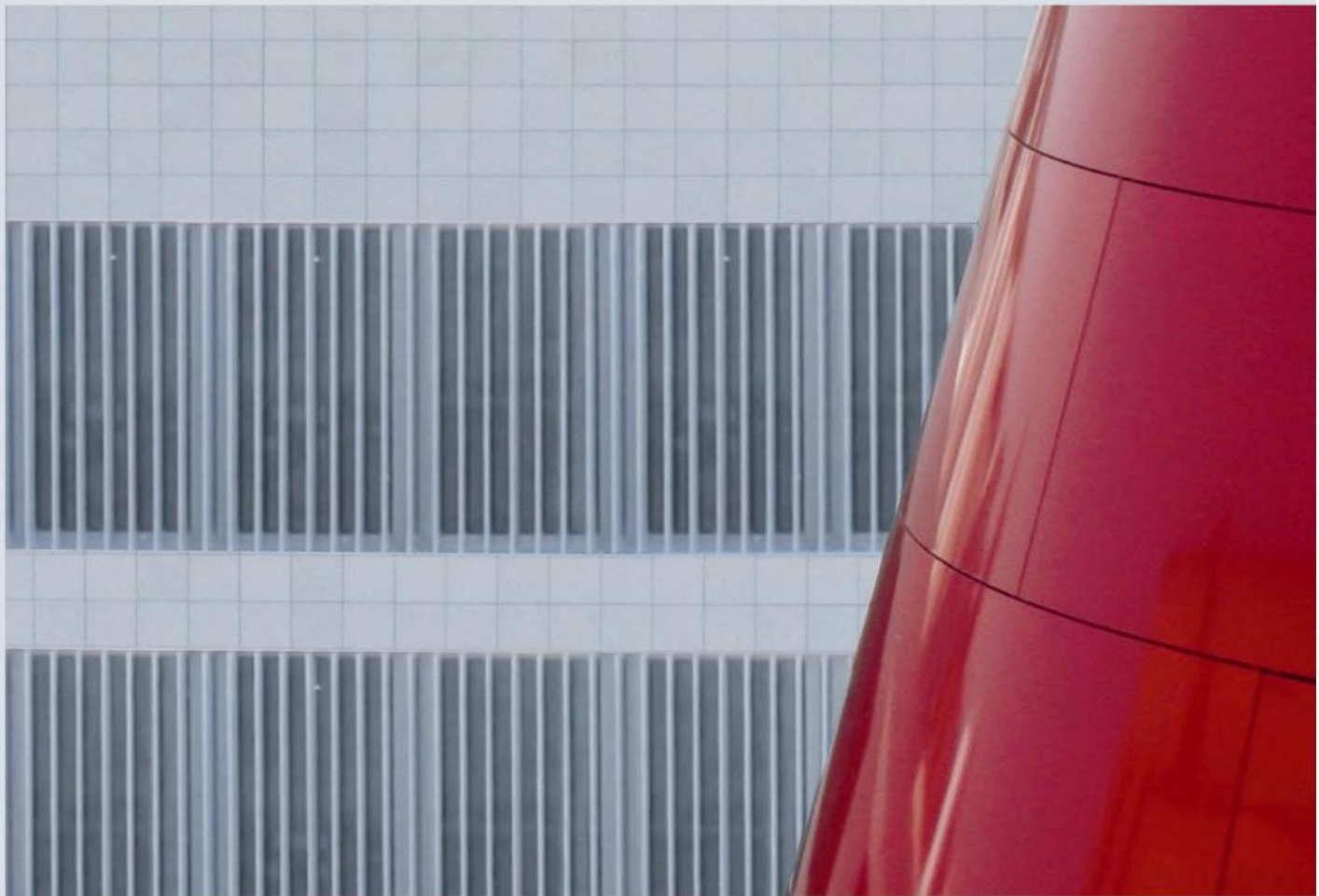


**DRIVE**ACADEMY®



**SEW**  
EURODRIVE



Product Training  
**Using SEW Workbench**  
Drive selection

**M01**



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## Document information

File name: WB\_Using\_SEW\_Workbench.doc rev 39 Title: change Title

Created by: Michael Kropp Number of pages: 31

Saved on: 24-Apr-2009

Print date: 2-Nov-2009

## 2 Drive selection data

In order to be able to precisely the components for your drive, certain data is required. This values are:

Drive selection data			Your entry
$n_{amin}$	Minimum output speed	[rpm]	
$n_{amax}$	Maximum output speed	[rpm]	
$P_a$ bei $n_{amin}$	Output power at minimum output speed	[kW]	
$P_a$ bei $n_{amax}$	Output power at maximum output speed	[kW]	
$M_a$ at $n_{amin}$	Output torque at minimum output speed	[Nm]	
$M_a$ at $n_{amax}$	Output torque at maximum output speed	[Nm]	
$F_R$	Overhung loads acting on the output shaft. Force application in center of shaft end is assumed. If not, please specify the exact application point giving the application angle and direction of rotation of the shaft for recalculation.	[N]	
$F_A$	Axial load (tension and compression) on the output shaft	[N]	
$J_{load}$	Mass moment of inertia to be driven	[10 <sup>-4</sup> kgm <sup>2</sup> ]	
<b>R, F, K, S, W M1 - M6</b>	Required gear unit type and mounting position (→ section Mounting Positions, churning losses)	-	
<b>IP..</b>	Required degree of protection	-	
$\vartheta_{Amb}$	Ambient temperature	[°C]	
<b>H</b>	Installation altitude	m above sea level	
<b>S.., ..% cdf</b>	Duty type and cyclic duration factor (cdf) or exact load cycle can be entered.	-	
<b>Z</b>	Starting frequency; alternatively, exact load cycle can be specified	[1/h]	
$f_{supply}$	Line frequency	[Hz]	
$U_{Mot}$ $U_{brake}$	Operating voltage of motor and brake	[V]	
$M_B$	Required braking torque	[Nm]	
<b>For inverter operation: Required control type and setting range</b>			

Important are:

- .. Direct on line or .. variable speed (with frequency inverter)

Application / sort of machine:

- .. Hoist, Lift
- .. Travel drive
- .. Conveyor belt
- .. Roller conveyor
- .. .....
- .. .....

**In addition we need (see catalogue):**

**Gear unit type:**

- Helical     Parallel shaft helical     Helical-bevel     Helical-worm     Spiroplan®  
 Multi-stage     Servo     Variable speed     EMS     Other: \_\_\_\_\_

**Power:** \_\_\_\_\_ kW    **Output speed:** \_\_\_\_\_ rpm    **Output torque:** \_\_\_\_\_ Nm

**Cycles/h:** \_\_\_\_\_ c/h    **Cyclic duration factor:** S \_\_\_\_\_ / \_\_\_\_\_ % cdf  
 1-shift operation     2-shift operation     3-shift operation  
 Uniform     Non-uniform     Extremely non-uniform

**Mounting position:**

- M1 M2 M3 M4 M5 M6 Pivoting

**Housing type:**

- Foot-mounted     Flange (bore)     Flange (thread)  
 Torque arm     Other: \_\_\_\_\_

**Shaft type:**

- Solid shaft with key     Shrink disk    Shaft/hollow shaft Ø: \_\_\_\_\_ mm  
 Hollow shaft with key     TorqLOC®    Flange Ø: \_\_\_\_\_ mm

**Shaft position (right-angle units):**

- A |  B |  AB

**Terminal box position:**

- 0°(R) |  90°(B) |  180°(L) |  270°(T)

**Cable entry:**

- X |  1 |  2 |  3

**Degree of protection:**

- IP54 IP55 IP56 IP65 IP66 IP69K

**Thermal class:**

- 130(B) 155(F) 180(H)

**Surface/corrosion protection:**

- KS OS1 OS2 OS3 OS4

**Mains voltage:** \_\_\_\_\_ V

Mains frequency:  50Hz  60Hz

**Connection type:**

- Δ     Y     YY     Y/Y

For inverter operation: Max. frequency: \_\_\_\_\_ Hz

**Control range:** \_\_\_\_\_

**Required options:**

- Brake: voltage \_\_\_\_\_ V    Braking torque: \_\_\_\_\_ Nm  
 Manual brake release:     HR or  HF  
 Forced cooling fan:    Forced cooling fan voltage: \_\_\_\_\_ V  
 Motor protection:     TF or  TH  
 Encoder: \_\_\_\_\_  
 Plug connection: \_\_\_\_\_  
 Inverter: \_\_\_\_\_  
 RAL 7031    or     RAL \_\_\_\_\_

**Other options:**

**Special ambient conditions:**

Temperature from \_\_\_\_\_ °C to \_\_\_\_\_ °C     Outdoor use     Installation >1000m above msl

Other ambient conditions: \_\_\_\_\_

Other: \_\_\_\_\_

### 3 Example 1 - Helical gear unit for a belt drive

#### 3.1 Select a gearmotor

**Customer data:**

**Gear unit type:**

- Helical     Parallel shaft helical     Helical-bevel     Helical-worm     Spiroplan®  
 Multi-stage     Servo     Variable speed     EMS     Other: \_\_\_\_\_

**Power:** \_\_\_\_\_ kW    **Output speed:** 32 rpm    **Output torque:** 200 Nm

**Cycles/h:** 100 c/h    **Cyclic duration factor:** S \_\_\_\_\_ / \_\_\_\_\_ % cdf  
 1-shift operation     2-shift operation     3-shift operation  
 Uniform     Non-uniform     Extremely non-uniform

**Mounting position:**

- M1 M2 M3 M4 M5 M6 Pivoting

**Housing type:**

- Foot-mounted     Flange (bore)     Flange (thread)  
 Torque arm     Other: \_\_\_\_\_

**Shaft type:**

- Solid shaft with key     Shrink disk    Shaft/hollow shaft Ø: \_\_\_\_\_ mm  
 Hollow shaft with key     TorqLOC®    Flange Ø: \_\_\_\_\_ mm

**Shaft position (right-angle units):**

- A     B     AB

**Terminal box position:**

- 0°(R)     90°(B)     180°(L)     270°(T)     X     1     2     3

**Cable entry:**

**Degree of protection:**

- IP54 IP55 IP56 IP65 IP66 IP69K

**Thermal class:**

- 130(B) 155(F) 180(H)

**Surface/corrosion protection:**

- KS OS1 OS2 OS3 OS4

**Mains voltage:** \_\_\_\_\_ V

Mains frequency:  50Hz     60Hz

**Connection type:**

- Δ     Y     YY     Y/Y

For inverter operation: Max. frequency: \_\_\_\_\_ Hz

**Control range:** \_\_\_\_\_

**Required options:**

- Brake voltage \_\_\_\_\_ V    Braking torque: \_\_\_\_\_ Nm  
 Manual brake release:     HR or     HF  
 Forced cooling fan:    Forced cooling fan voltage: \_\_\_\_\_ V  
 Motor protection:     TF or     TH  
 Encoder: \_\_\_\_\_  
 Plug connection: \_\_\_\_\_  
 Inverter: \_\_\_\_\_  
 RAL 7031    or     RAL \_\_\_\_\_

**Other options:**

**External mass moment of inertia: 0.0015 kgm<sup>2</sup> reduced to motor shaft**

**Special ambient conditions:**

Temperature from \_\_\_\_\_ °C to \_\_\_\_\_ °C     Outdoor use     Installation >1000m above msl

Other ambient conditions: \_\_\_\_\_

Other: \_\_\_\_\_

If you don't have further information ask customer or take the SEW Standard (see catalogue)

### 3.2 Solution

#### 3.2.1 Required power

$$P_N = \frac{M_L * n}{9550 * h_G} = \frac{200Nm * 32rpm}{9550 * 0.95} = \mathbf{0.705 \text{ kW}}$$

η off gear unit assumption: 3 stage gear unit ⇒ η = 95%

#### 3.2.2 Selection motor

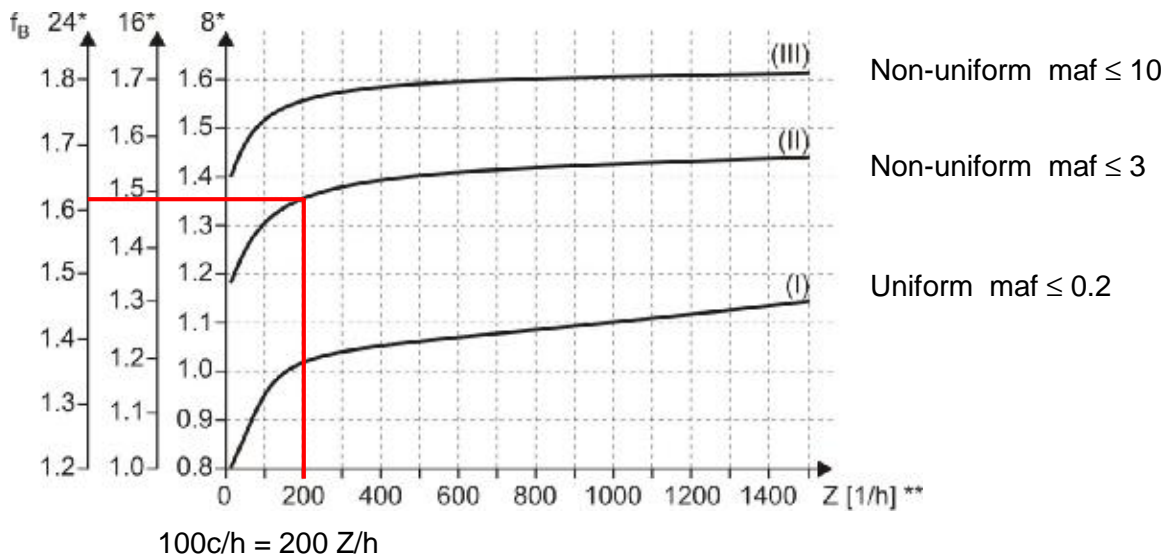
Selected: DRE80M4  
 Standard is a 4 pole motor  
 Here without brake because there is no customer request

Technical data:

- P<sub>N</sub> = 0.75 kW
- n<sub>N</sub> = 1435 rpm
- J<sub>mot</sub> = 0.00215 kgm<sup>2</sup>

#### 3.2.3 Required SEW service factor

$$\text{mass acceleration factor (maf)} = \frac{J_x}{J_{mot}} = \frac{0.0015kgm^2}{0.00215kgm^2} = 0.7 \Rightarrow \mathbf{\text{loading class II}}$$



**Required service factor: 1.61**

### 3.3 Selection of gearmotor with catalogue

Take the catalogue DR Gearmotors AUS/NZ 09/2008 and select a gearmotor

#### R57DRE80M4

We have the choice to take 30rpm or 33rpm output speed. Ask customer what he wants.

**In both cases the service factor of gearmotor 1.85 or 2.1 is higher than the required. 1.61.**

#### AC gearmotor with helical gear unit

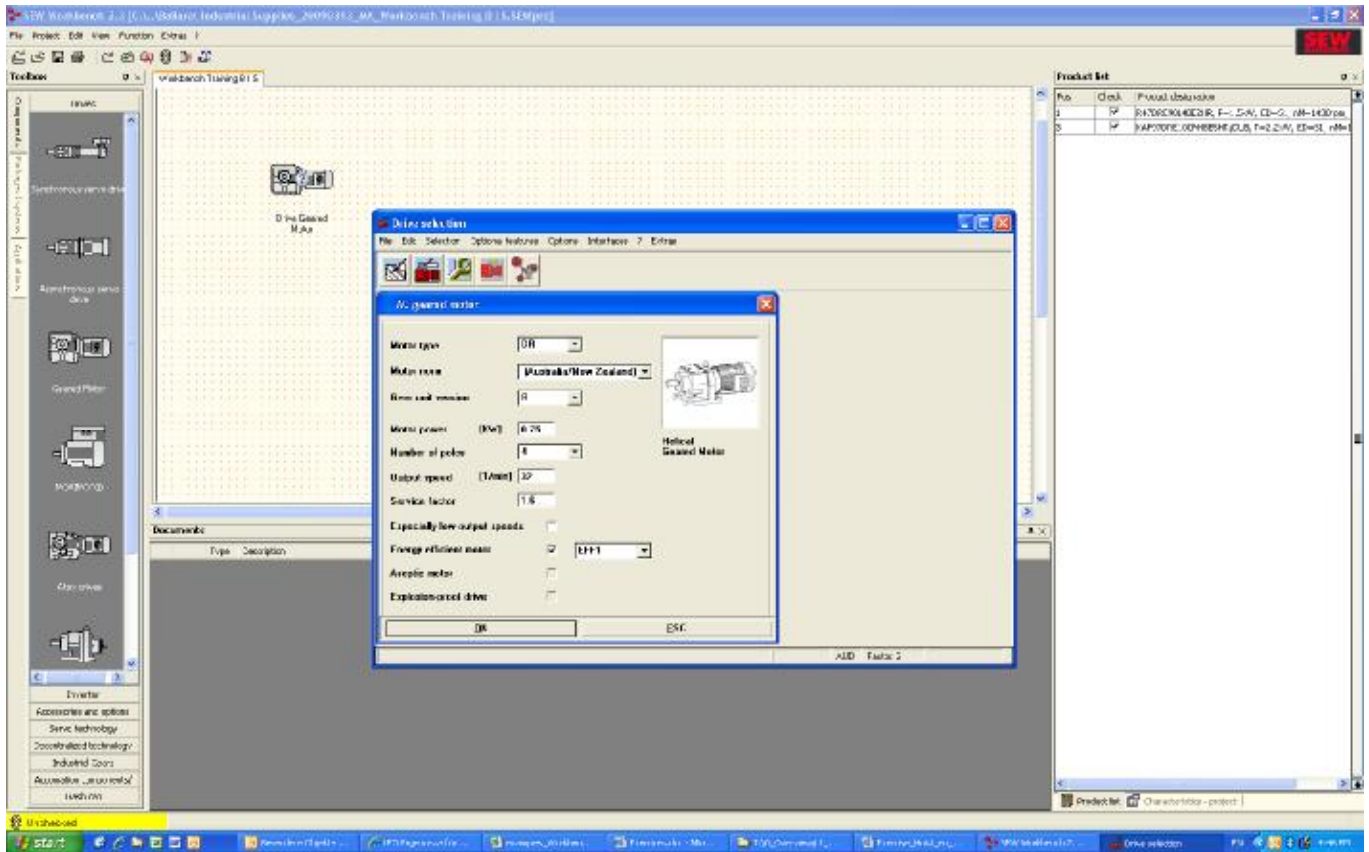
##### R57DRE80M4

Application reference	:	Belt drive - example 1
Rated motor speed	[rpm] :	1435
Rated output speed	[rpm] :	30
Total gear ratio	:	48.23
Rated output torque	[Nm] :	240
Service factor (rated operation)	:	1.85
Mounting position / IM	:	M1
Output shaft	[mm] :	35x70
Perm. output overhung load when n=1400	[N] :	6860
Motor rated power	[kW] :	0.75
Cyclic duration factor	:	S1
Motor voltage	[V] :	230/400
Wiring diagram	:	R13
Frequency	[Hz] :	50
Rated current	[A] :	2.9 / 1.68
cos Phi	:	0.78
Temperature class	:	130(B)
Enclosure	:	IP 54
Weight	[kg] :	32

### 3.4 Selection of gearmotor with workbench

Open workbench and a new project.

Drag and drop a drive – Geared motor to the working area. Double click to open the drive selection window. Select the different data as you can see it on the screen.



You can select the search options to find less gear motors (sometimes it is better to have the default).