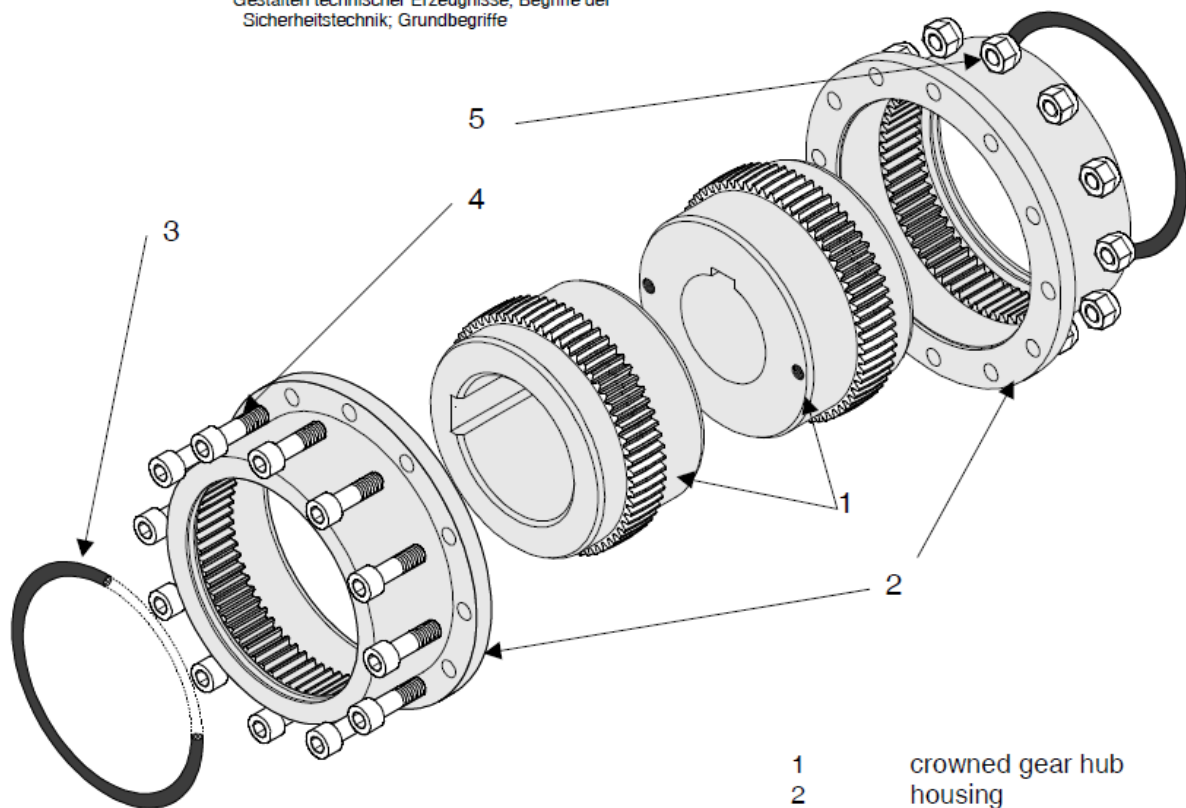


Assembly and Maintenance instruction

Gear coupling Series TMZ – A

Standards and rules used

DIN 740-1	Antriebstechnik; Nachgiebige Wellenkupplungen; Anforderungen; Technische Lieferbedingungen;
DIN 740-2	Antriebstechnik; Nachgiebige Wellenkupplungen; Begriffe und Berechnungsgrundlagen
VDI 2230 Blatt 1	Systematische Berechnung hochbeanspruchter Schraubenverbindungen; Zylindrische Einschraubverbindungen
DIN-VDE 31000-2	Allgemeine Leitsätze für das sicherheitsgerechte Gestalten technischer Erzeugnisse; Begriffe der Sicherheitstechnik; Grundbegriffe



- 1 crowned gear hub
- 2 housing
- 3 O - Ring
- 4 threaded bolt
- 5 self locking nut



Assembly and Service Manual for TMZ-A Gear Coupling

1. Assembly

- 1.1 Before assembly, check that all parts are complete and remove any traces of preservatives and greases.
- 1.2 Before alignment of machine without thrust bearings and with restricted end play, the "zero position" of the machine shaft (the magnetic mean of the rotor where electric motors are concerned) must be firstly determined and marked on the machine.
- 1.3 Lightly lubricate sealing rings (O-ring) and insert them into the cleaned O-ring grooves in casings.
- 1.4 Push casing halves over free shaft ends, taking care not to damage the sealing rings.
- 1.5 Using either an oil bath or electric furnace, evenly warm the toothed hubs inductively, until they have reached the dimension required for assembly. (Using standard models temperature up to ca. 120 °C). During warming them, take care of danger – hot surfaces.
- 1.6 Mount the hubs in the direction as stipulated in the construction drawing, (Observing the asymmetric toothing position), flushing with the shaft ends. In so doing, the sealing rings in the casing must not come into contact with the hot hub!
- 1.7 Align shaft ends carefully. Check hub distance "m" and adjust it in accordance with the dimension sheet or by using a belonging drawing as a basis. If in double, please contact us! The maximum permitted misalignment of hubs depends on operating speed. See diagram 1.
- 1.8 Lubricate the internal and external toothing with a suitable lubricant (table 1) and push two casing halves over the hubs. Cover thread holes in the hubs with adhesive tape in order to avoid damage of the sealing.
- 1.9 Insert sealing material between casing flanges. Position screws (lubricant nipple) the most possible 90° opposite to each other. Tighten hexagon fit-bolts evenly, applying the exact tightening torque (see table 2). It must be possible to freely displace the coupling casing a distance of dimension $m/2$ (see table 3) in a direction. In another direction the disassembly distance S must be kept. Check up the possibility of free room of the hub.
- 1.10 Unscrew the screw plugs on casing halves and position the screw holes on the opposite side horizontally. Using a grease gun, inject lubricant into the holes until it comes out on the bore hole opposite. After successfully filling lubricant, re-insert all screw plugs. (see lubricant table also)
- 1.11 In accordance with accident prevention regulations, all freely moving parts must be covered with fixed guard plates!

Table :

Grease quantity for Standard – gear couplings

T M Z A	size	0	1	2	3	4	5	6	7	8	9	10	11
quantity	[kg]	0,08	0,09	0,16	0,27	0,47	0,68	0,93	1,54	2,28	3,10	3,9	6,20
	[cm ³]	90	100	180	300	520	760	1000	1700	2550	3450	4350	6900

Grease indexes

For your information we list a few brands of grease suitable for the lubrication of our couplings at the operating temperature of $-20^{\circ}\text{C} < T < +70^{\circ}\text{C}$

Operating temperature	Penetration index DIN ISO (ASTM)	Grade DIN (NGLI)
$< -20^{\circ}\text{C}$	bitte fragen Sie uns	
$\geq -20^{\circ}\text{C} < 30^{\circ}\text{C}$	350 - 380	0
$\geq 30^{\circ}\text{C} < 70^{\circ}\text{C}$	300 - 350	1
$\geq 70^{\circ}\text{C}$	bitte fragen Sie uns	

brands.

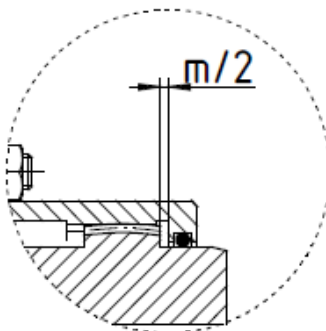
manufacturer		manufacturer	
AGIP	GR - MU EP	Shell	ALVANIA EP
Chevron	DURA-LIGHT EP	Klüber	Grafoscon C-SG 500
Esso	BEACON EP	Texaco	MULTIFAK EP 0
Mobil	MOBILTEMP 78	Total	MULTI EP 1

Table 1

Tightening torque T_{an} [Nm]

T M Z bolt	size M	0 M8	1 M10	2 M10	3 M12	4 M12	5 M16	6 M16	7 M16	8 M18	9 M22	10 M22	11 M24
T_{an}	[Nm]	25	50	50	85	85	205	205	205	283	532	532	690

Table 2



clearance $m/2$ [mm]

T M Z	size	0	1	2	3	4	5	6	7	8	9	10	11
$m/2$	[mm]	1,5	1,5	1,5	2,5	2,5	3,0	3,0	4,0	4,0	4,0	4,0	5,0

Table 3

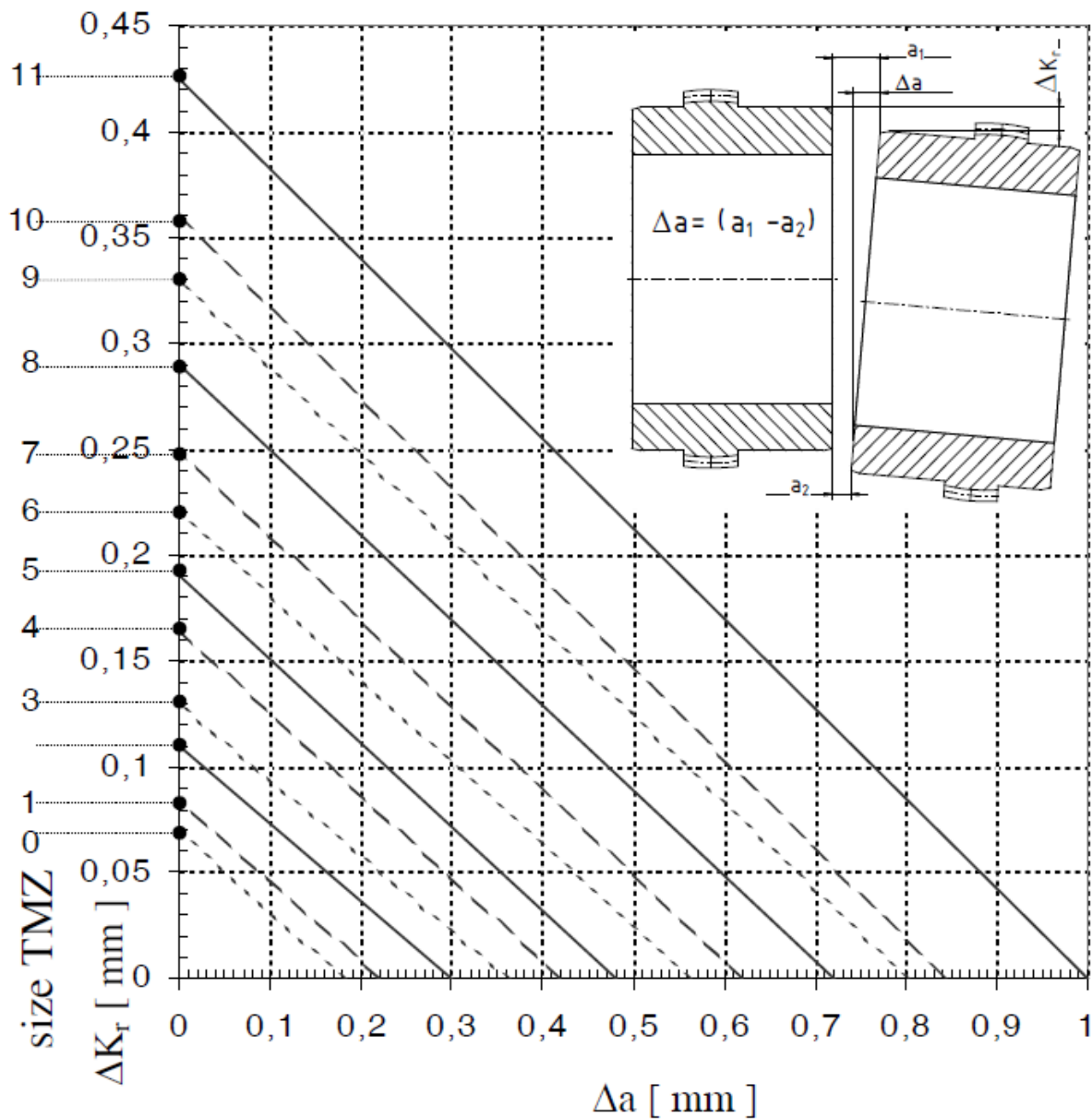


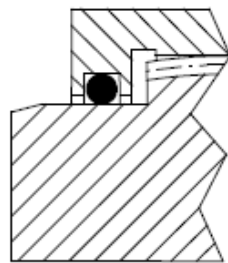
Diagram 1

2. maintenance

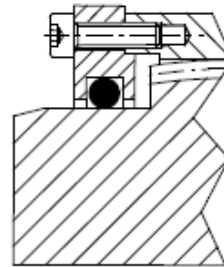
- 2.1 Every 3.000 hours of operation check the free axial movement $\pm m/2$ of the housing (item 1.9) and add new grease (item 1.10)
- 2.2 After every 8.000 hours of operation or every two years the coupling has to be opened. Clean the toothings and replace the grease completely. Check the toothings, sealing rings (O-rings) for wear and damage. Inspect the correct shaft alignment. Mark the position of housing and hubs to re-assemble the toothings in the same operating position.

3. Couplings with O-Ring cover

3.1 besides couplings with integrated O-Ring housing (Series TMZ – A....) we supply upon request housings with separated O-Ring cover (Series TMZ – A...C).



integrated
O-Ring housing



separated
O-Ring-cover

3.2 Mount the hubs in the direction as stipulated in the construction drawing, (Observing the asymmetric toothing position), flushing with the shaft ends. In so doing, the sealing rings in the casing must not come into contact with the hot hub!

3.3 following steps starting with 1.7 ff .

3.4 tightening torque for bolts of O-Ring cover

tightening torque T_{an} [Nm] for bolts of O-Ring cover

bolt	M	M 5	M 6	M 8	M 10	M 12	M 16	M 18
T_{an}	[Nm]	5	8	20	40	70	180	240



recommended grease

Series TMZ - A... gear coupling

Sufficient greasing of gear couplings is of highest importance for the lifetime.

Following tables inform you about the grease quantity and a few brands recommend lubricants.

Grease quantity for standard gear couplings

T M Z	Grösse	0	1	2	3	4	5	6	7	8	9	10	11
Menge	[kg]	0,08	0,09	0,16	0,27	0,47	0,68	0,93	1,54	2,28	3,10	3,9	6,20
	[cm ³]	90	100	180	300	520	760	1.000	1.700	2.550	3.450	4.350	6.900

T M Z	Grösse	12	13	14	15	16	17	18	19	20			
Menge	[kg]	5,0	6,0	8,0	10,0	12,0	18,0	21,0	25,0	38,0			
	[cm ³]	5.600	6.600	8.900	1.1000	13.500	20.000	23.500	27.800	42.500			

Characteristics of recommended lubricants

We recommend lubricants based Lithium added E.P. additives.

Ambient temperature	Penetration index DIN ISO (ASTM)	Grade DIN (NGLI)	
< -20°C	Please contact us		
≥ -20°C < 30°C	350 - 380	0	
≥ 30°C < 70°C	300 - 350	1	
≥ 70°C	Please contact us		

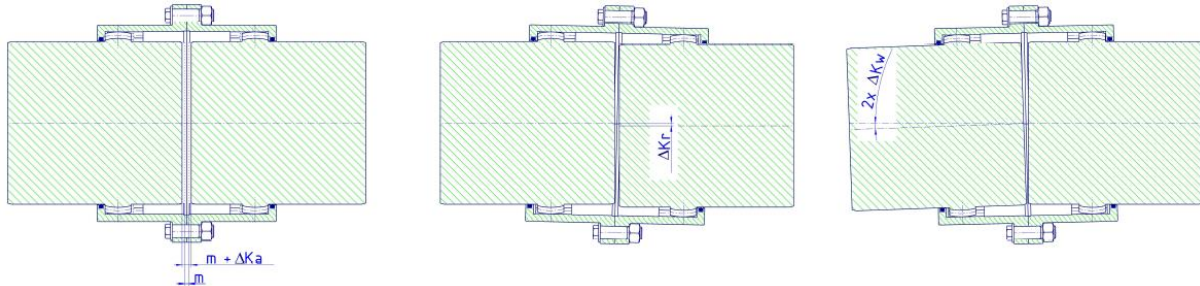
It is advised to check the grease quantity every 6 months of operation and add lubricant if necessary. After 8000 h of constant operation or after 2 year it is required to change the complete quantity of grease.

Overview of some lubricants.

manufacturer		manufacturer	
AGIP	GR - MU EP	Shell	ALVANIA EP
Chevron	DURA-LIGHT EP	Klüber	Grafloscon C-SG 500 Plus
Esso	BEACON EP	Texaco	MULTIFAK EP 0
Meguin	Megol KP1K-35	Total	MULTI EP 1
Mobil	MOBILTEMP 78		

Alignment of shafts

Series TMZ - A... couplings



T M Z	size	0	1	2	3	4	5	6	7	8	9	10	11
ΔK_a 	m	3	3	3	5	5	6	6	8	8	8	8	10
	$\pm \Delta K_a$	± 3	± 3	± 3	± 5	± 5	± 6	± 6	± 8	± 8	± 8	± 8	± 10
	Special design upon request				only valid for special design on request								
ΔK_r 	max.	0,85	1,0	1,3	1,55	2,0	2,3	2,6	3,0	3,5	4,0	4,3	5,2
	max. at 1500 min ⁻¹	0,3	0,3	0,35	0,35	0,4	0,4	0,45	0,45	0,5	0,5	0,5	0,5
	max. at 500 min ⁻¹	0,7	0,8	1,0	1,1	1,4	1,5	1,5	1,5	1,5	1,8	1,8	1,8
	max. at 200 min ⁻¹	0,8	0,9	1,1	1,3	1,7	2,0	2,4	2,7	3,0	3,5	3,8	4,5
ΔK_w 	max. [°]	1°	1°	1°	1°	1°	1°	1°	1°	1°	1°	1°	1°
	max. [°] at 1500 min ⁻¹	0,4°	0,3°	0,25°	0,25°	0,2°	0,2°	0,15°	0,15°	0,15°	0,1°	0,1°	0,1°
	max. [°] at 500 min ⁻¹	0,9°	0,9°	0,8°	0,8°	0,7°	0,7°	0,6°	0,5°	0,5°	0,4°	0,4°	0,4°

The values given refer to the max. displacement capacity of the couplings..

During alignment of couplings the values shall not exceed 15% of the given values in order to have best operating conditions.

See page 2 of shaft misalignments series TMZ

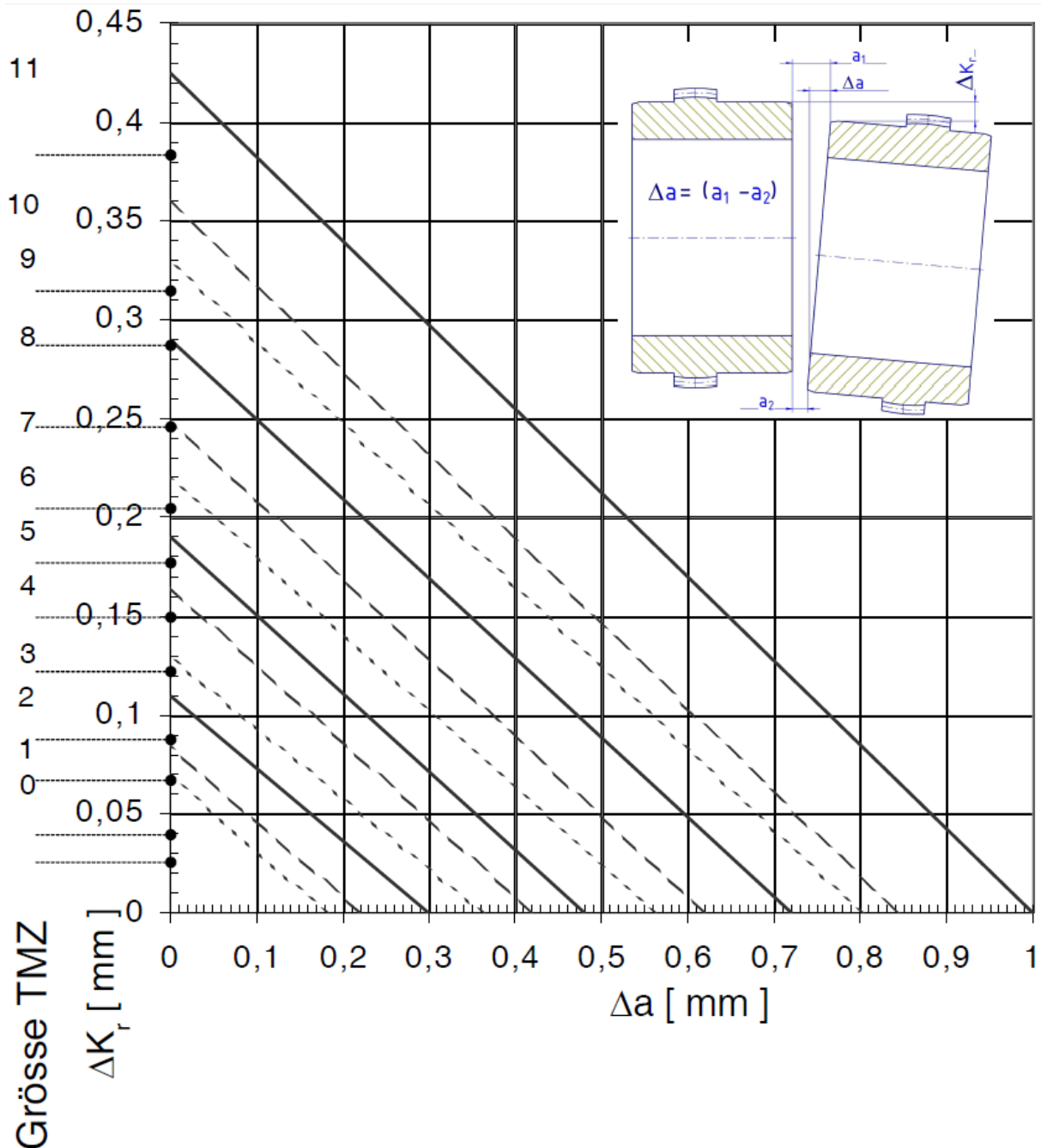
Accurate alignment increases the life of the coupling and reduces forces to the adjacent shafts and bearings.

Alignment of shafts

Series TMZ - A... couplings

The above given values refer to the maximum misalignment values for the coupling.

In order to operate the clutch with satisfactory service life in operation should not be exceeded 15% of this value. Larger displacements require higher vibratory movements in the teeth. The displacements should not exceed the following values for the individual variables.

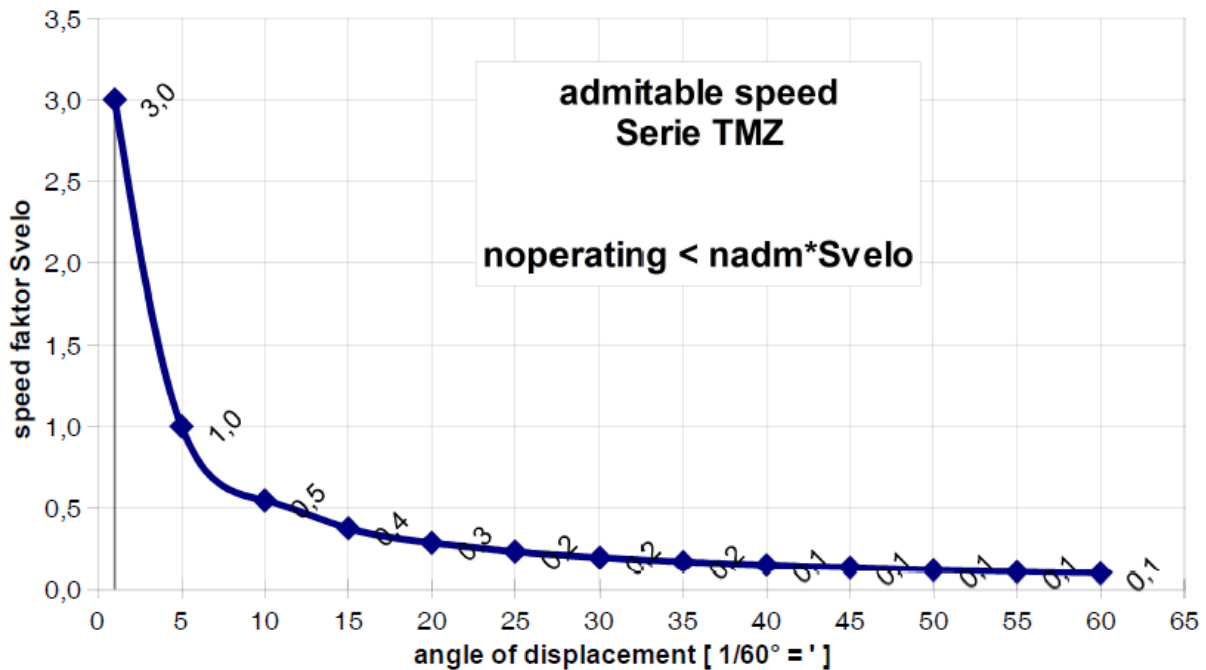




Alignment of shafts

Series TMZ - A... couplings

The diagram below outlines the permissible speed in dependence of the displacement of the tooth couplings series TMZ. Here are considered as a parameter the recommended lubricants as well as the introduced friction power.



TMZ Grösse	Zulässige Drehzahl n_{zul} [1/min]
0	6000
1	4600
2	4100
3	4000
4	3900
5	3700
6	3200
7	2900
8	2500
9	2300
10	2100
11	1800