

Приложение № 3

ДО УПРАВИТЕЛЯ
 НА „БДЖ-ПЪТНИЧЕСКИ ПРЕВОЗИ“ ЕООД

ИНДИКАТИВНО ЦЕНОВО ПРЕДЛОЖЕНИЕ

От: Димитър Ангелов Касима – Д ЕТ
 ЕИК/Булстат/ - BG 831134628
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 Данни за банковата сметка: IBAN – BG85STSA93001521016081..BIC- STSABG5F

УВАЖАЕМИ ГОСПОДИН УПРАВИТЕЛ,

След запознаване с поканата за провеждане на пазарни консултации във връзка с чл.44, ал.1 от ЗОП с цел определяне на прогнозираната стойност на обществена поръчка с предмет „Доставка лагери за ТПС“ с четиринадесет обособени позиции, Ви представям:

I. Индикативно ценово предложение за изпълнение на поръчката:

За обособена позиция 1:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|-------------|-----------|----------------|----------------|------------|----------------------|----------------------------|
| 1 | NU 1034 MC4 | 40 | Тягов двигател | 68 E 100 - 012 | 24 | | |

За обособена позиция 2:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|------------|-----------|----------------|----------------|------------|----------------------|----------------------------|
| 2 | NH 421 MC5 | 40 | Тягов двигател | 68 E 100 - 013 | 54 | | |

За обособена позиция 3:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|---------------|-----------|--------------|---------------|------------|----------------------|----------------------------|
| 3 | PLC 411-10 BM | 40 | Вулков лагер | 68 E 15 - 016 | 16 | 784,00 | 12544,00 |

За обособена позиция 4:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|-------------|-----------|------------------------------|---------------|------------|----------------------|----------------------------|
| 4 | NJ 1060 MC3 | 40 | Лагер на редуктора (хамутен) | 68 E 14 - 013 | 48 | | |

За обособена позиция 5:

| обособена позиция № | Означение | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|--------------|-----------|---|------------|----------------------|----------------------------|
| 5 | 80-232726Л1М | 32 | С допълнителна шайба за буксите на 32 серия | 60 | | |

За обособена позиция 6:

| обособена позиция № | Означение | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|-------------|-----------|-------------------------------------|------------|----------------------|----------------------------|
| 6 | 80-42726Л4М | 32 | С борд, буксов. буксите на 32 серия | 40 | | |

За обособена позиция 7:

| обособена позиция № | Означение | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|------------|-----------|-----------------------------|------------|----------------------|----------------------------|
| 7 | NL 417 MC4 | 32 | Тагов Двигател към колектор | 24 | | |

За обособена позиция 8:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|-----------|-----------|---|-------------|------------|----------------------|----------------------------|
| 8 | T 08 B | 55 | Дизелов двигател - Биелен плъзгащ лагер /черупка/ | 4-303-014 | 24 | | |

За обособена позиция 9:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|-----------|-----------|--|-------------|------------|----------------------|----------------------------|
| 9 | T 01 B | 55 | Дизелов двигател - Радиален плъзгащ лагер за колянов вал /черупка/ | 4-100-104 | 36 | | |

За обособена позиция 10:

| обособена позиция № | Означение | Серия ТПС | За агрегат | Каталожен № | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|-----------|-----------|---|-------------|------------|----------------------|----------------------------|
| 10 | T 02 B | 55 | Двигател - Радиално-аксиален плъзгащ лагер за колянов вал /черупка/ | 4-100-107 | 8 | | |

За обособена позиция 11:

| обособена позиция № | Означение | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|----------------|-----------|--------------------------|------------|----------------------|----------------------------|
| 11 | 6314 MA SC3 SO | 55 | Хозообръщателен редуктор | 2 | | |

За обособена позиция 12:

| обособена позиция № | Описание | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|------------------|-----------|-----------------------|------------|----------------------|----------------------------|
| 13 | 6306 MAUP CS SIL | 55 | Турбокомпресор VTR250 | 3 | | |

За обособена позиция 13:

| обособена позиция № | Описание | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|------------------|-----------|-----------------------|------------|----------------------|----------------------------|
| 13 | 7306 AMAUPSODFAL | 55 | Турбокомпресор VTR250 | 6 | | |

За обособена позиция 14:

| обособена позиция № | Описание | Серия ТПС | За агрегат | количество | ед.цена лева без ДДС | обща стойност лева без ДДС |
|---------------------|--------------|-----------|--|------------|----------------------|----------------------------|
| 14 | 95512X-95925 | 55 | Конусен ролков лагер за колоосни редуктори | 8 | | |

Обща стойност на индикативното ценово предложение е 12 544,00 лв. без ДДС.

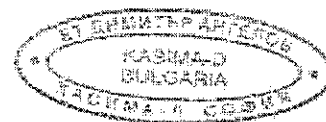
II. Предложените от нас цени в лева без ДДС, важат за целия срок на валидност на офертата и включват всички необходими и съответстващи разходи за изпълнението на обществената поръчка.

III. Срок на валидност на офертата – 6 месеца *(не по-кратък от 6 месеца)*.

Дата: 04.05.2022

Подпис:.....

(име и фамилия, длъжност)



Заличено на основание Регламент 2016/649



ZKL GROUP

The history is cornerstone of the present time
as well as challenge to the future.

CERTIFICATE

This is to certify that
KASMA - D

Bld. 93-a Vratsha, 1400 Sofia, Bulgaria

is an authorized Distributor in the territory of Bulgaria only of

"ZKL" branded bearings supplied by

ZKL BEARINGS CZ. A.S., BRNO, CZECH REPUBLIC,

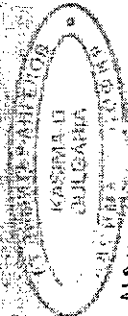
being a member of the ZKL Group, Brno, Czech Republic.

Validity of this certificate until 31.12.2022

Brno, January 20th, 2022

For ZKL BEARINGS CZ. A.S.

Вярно с операцията!



Документ № ОХОДОВАТА РЕГИСТРАЦИЯ 2016/648

ДЕКЛАРАЦИЯ

за съответствие с „Технически изисквания за доставка на лагери за
нуждите на „БДЖ – Пътнически превози“ ЕООД с предмет
„Доставка на лагери за ТПС“

Долуподписаният Димитър Борисов Ангелов
в качеството ми на Управител на ЕТ „Д. АНГЕЛОВ КАСИМА - Д“
участник в настоящата пазарна консултация с предмет
„Доставка на лагери за ТПС“ на „БДЖ-Пътнически превози“ ЕООД

ДЕКЛАРИРАМ

Предлаганите в настоящата оферта буксови лагери тип PLC 411-10 с месингов сепаратор, произведени от ZKL Бърно, а.д. - Чешка република, напълно съответстват на лагерите PLC 411-10 BM посочени в Спецификацията на Възложителя.

Лагерите са произведени съгласно изискванията на стандарта EN 12080 за буксови лагери за железопътни превозни средства, в доказателство на което е приложен заверен от Производителя чертеж, с посочени изискуемите параметри.

Гаранционният пробег е минимум 600 000 км или 3 години, считано от датата на монтажа, но не повече от 4 години от датата на доставката.

Маркировката на лагерите съдържа каталожно означение, търговска марка „ZKL“, месец/година на производство (код).

Лагерите се доставят в стандартни опаковки с антикорозионна защита, гарантираща срок на складово съхранение минимум 2 години.

Всяка партида лагери ще се придружава със Сертификат тип „3.1“ или „3.2“ съгл. Стандарта EN 10204.

04.05.2022

Декларатор:

Димитър Ангелов
Управител на ЕТ „Д. АНГЕЛОВ КАСИМА-Д“

*Заложено на основание
Регламент 2016/649*

ОСΠΑЗЕН!



ZKL Kladno a.s.
Ořech. a.s.

INSPECTION CERTIFICATE
according to EN 10204,
category „ 3.1 “

No: 12021
Page no.: 1
Pages: 1

Order Number:
8410061381

Product name:
Bearing

Drawing number / Bearing type:
PLC 411-10

Note: We acknowledge, that the above-mentioned productions were made according to authorized drawings, valid Czech state norms and specifications ČSN EN 12040. The product meets the regulation of nuclear safety no. 307/2002 sb. Value of ionizing radiation < 100 Bq/kg.
Quantity of product: 9 pcs

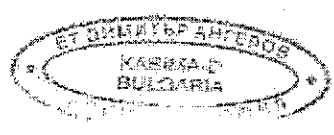
Drawing values (mm):
S2 - Ød: 190 -0,018
S2 - ØOD: 192 -0,130-0,170
S2 - Width: 84 -0,060
S1 - ØD: 300 -0,025
S1 - Width: 84 -0,060
Sorting rollers: 0,001
Radial internal clearance: 0,130-0,195
Dimension over rollers: 192 + 0,025

| | Serial number of test certificate | Ød S2 | ØOD S2 | Width S2 | ØD S1 | Dimension over rollers | Width S1 | Sorting rollers | Radial internal clearance |
|---|-----------------------------------|--------|--------|----------|--------|------------------------|----------|-----------------|---------------------------|
| 1 | 4591 | -0,014 | -0,150 | -0,025 | -0,008 | 0,003 | -0,050 | 0,001 | 0,153 |
| 2 | 4592 | -0,012 | -0,149 | -0,030 | -0,013 | 0,003 | -0,010 | 0,001 | 0,152 |
| 3 | 4593 | -0,013 | -0,148 | -0,030 | -0,013 | 0,003 | -0,015 | 0,001 | 0,149 |
| 4 | 4595 | -0,012 | -0,146 | -0,030 | -0,009 | 0,003 | -0,025 | 0,001 | 0,148 |
| 5 | 4596 | -0,014 | -0,148 | -0,030 | -0,010 | 0,008 | -0,030 | 0,001 | 0,154 |
| 6 | 4598 | -0,014 | -0,147 | -0,025 | -0,013 | 0,013 | -0,020 | 0,001 | 0,160 |
| 7 | 4594 | -0,013 | -0,147 | 0,030 | -0,005 | 0,005 | -0,020 | 0,001 | 0,153 |
| 8 | 4597 | -0,014 | -0,148 | -0,030 | -0,016 | 0,005 | -0,015 | 0,001 | 0,154 |

Posted: Quality Management Technical Inspection
Darek Technos
Datum: 6.4.2021

Взето с оригинала!

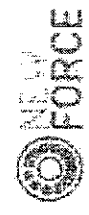
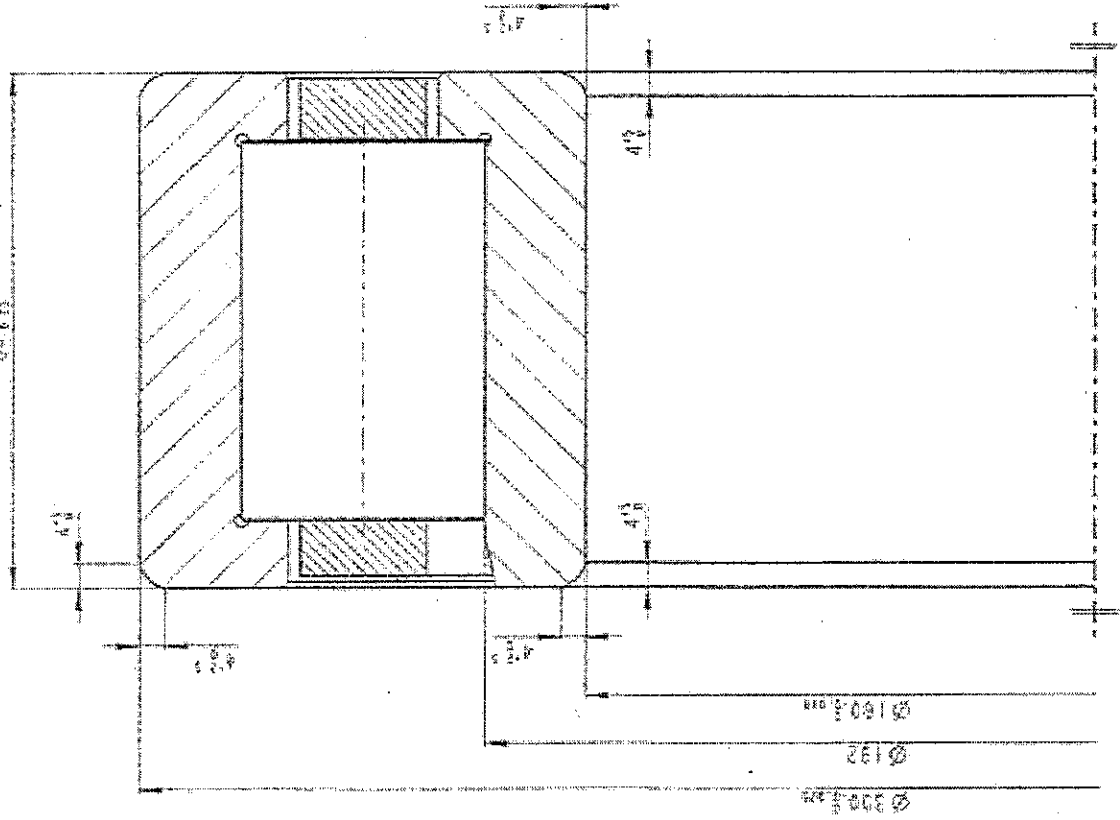
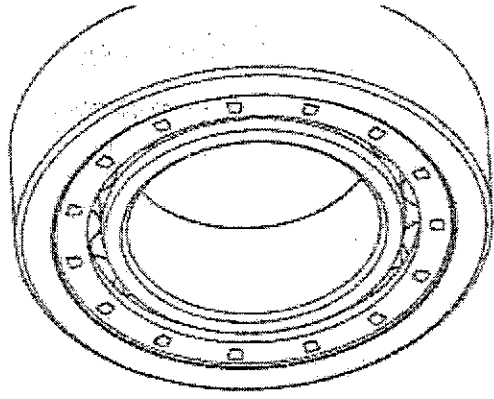
Записано на основание Регламент 2016/1649



Задача: динамич / Static Load Rating
 Опорный / Dynamic CR: 885 KR
 Статич / Static CR: 1250 KR

Precision / Accuracy: P6
 Precision of Mounting Dimensions: P6
 Precision of Groove: P6
 Mounting Precision: P6

Max. speed: 150 mm/s
 Radial hole / Radial Clearance: CR
 CR: 0.130 mm - 6.145 I



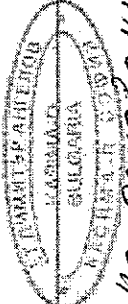
Polyline delimitation / Drawing Approval
 Firm / Company
 Address / Street / No.
 Name / Name
 Pattern / Date

2R - 2R1000 0 1000
 Case M Group

Jednorode wałkowe łożysko
 Single-row Cylindrical Roller Bearing

Model: 2R1000 0 1000
 Part: 2R1000 0 1000
 Material: Steel
 Size: 100 x 100 x 100
 Weight: 1000 g

PLC 411-10



Взято с оприлюдненим
 Санузго на одобавание Регламентом 2016/680



ZKL VÝZKUM A VÝVOJ, A.S.
ČERNÝ DŮBRŮV

MOUNTING INSTRUCTION MIN 03/12

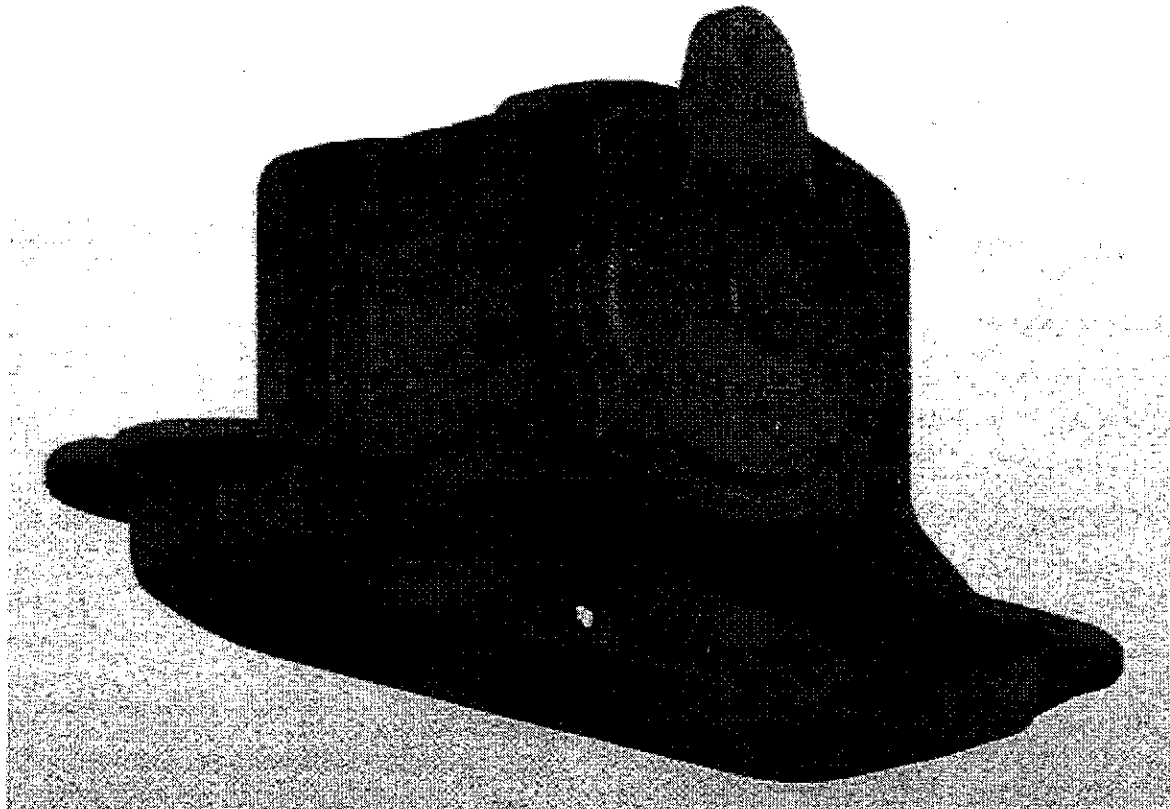
Rev. 2

Contact: support@zkl.cz

Date: 20. 04. 2016

**Mounting and maintenance instruction for
Axle cylindrical roller bearing units ZKL**

**PLC 410-13/14
PLC 410-13.2/14.2
PLC 410-15/16
PLC 410-15.2/16.2
PLC 410-33.2/34.2**



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Společnost zapsána v OR u KS v Brně, odd. B. v. 2908

www.zkl.cz



ZKL Bearings CZ
akciová společnost
Líšeňská 2828

(3)

*Заличено на основание
Регламент 2016/649*



ZKL VÝZKUM A VÝVOJ, A.S.
ČERNÁ GRUPA

MOUNTING INSTRUCTION MN 03/12

Rev. 2

Contact: support@zkl.cz

Date: 20. 04. 2016

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*Залічено на асудватіе
 Регнамент 2016/649*



ZKL VÝZKUM A VÝVOJ, A.S.
DI 255 58 480

MOUNTING INSTRUCTION MN 03/12

Rev. 2

Contact: support@zkl.cz

Date: 20. 04. 2016

1. GENERAL GUIDELINES

The purpose of this manual is to provide process technicians, mounting engineers and maintenance staff who are coming into the contact with roller bearings basic instructions for careful and appropriate assembling.

Using of proper mounting procedures, appropriate tools and proper maintenance are the basics that help to avoid the damage of the bearings during the assembly, and to achieve the operation run of the bearing without any defects and also achieving the maximum service life of the bearings.

Bearing installation can be carried out only in the workplace that is designated to it and is equipped with the appropriate tools and specific assembly tools. Important requirement is that all the tools are clean and each of the work steps is performed in a clean working environment. The impurities in the working environment have a negative impact on the bearing behavior during its run and may lead to the bearing failure.

Mounting and dismounting of a bearing unit requires professional treatment, therefore experienced personnel is necessary to be on place. Just a correct mounting leads to calculated bearing life.

2. PACKAGING AND BEARINGS STORAGE

Bearings are at the production plant before packaging treated with anti-rust fluid, which in combination with the original packaging protects the bearings against dust and weather conditions. The integrity of the original packaging must not be interrupted and the storage conditions must be appropriate.

Relative humidity in storage area should not exceed 60% and there should not be large temperature fluctuations. The most suitable temperature range for storing the bearings is from 15 to 25 ° C.

Bearings must be stored in original package like they arrived from the manufacturer. Bearings must be placed horizontally at a flat surface. Maximally free bearings can be stacked up on each other.

Surrounding environment and shelves must be dry, bearings cannot be stored on the floor. In common storage areas there must not be stored any chemicals (acids, alkalis, etc.).

Bearings with the preservation can be stored for up to five years, if the previously named conditions are fulfilled. Otherwise the storage period must be shorter.


3. PREPARATION FOR MOUNTING

3.1. Working Environment Requirements

The bearing assembly must be done in clean environment, free of dust and moisture. There must not be any other work activity (such as grinding, polishing, welding etc). The mounting area must have stable temperature – minimum 16°C and must be protected to other influences such as air flow and so on. There must be a good lighting in working area.

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*Заличено на основании
Регламент 2016/049*



ZKL VÝZKUM A VÝVOJ, A.S.
ČESKÁ REPUBLIKA

MOUNTING INSTRUCTION MN 03/12

Rev. 2

Contact: support@zkl.cz

Date: 20. 04. 2016

3.2. Assembly Tools, Accessories, Gauges

The area must be equipped with appropriate tools, accessories and gauges to assure the proper assembly, working safety and to prevent bearing damage.

Necessary tools for mounting and checking:

- the gauge for length and shape of the shaft control
- steel ruler 200 x 25 x 6 for the shaft control
- micrometer for the shaft control
- special dial gauge with 0,001 mm scale or pasameter with 0,002 mm scale for shaft measurement
- special dial gauge with 0,001 mm scale for housing hole measurement
- set of feeler gauges
- polyamide hammer of mass 3 – 5 kg
- housing for mounting the thrust (shoulder) ring
- sleeve for punching the rings onto the pin
- mounting tools mentioned further in the text for mounting the subassemblies to inner rings
- induction heating with temperature check device
- HSE protective equipment for dealing with hot parts
- common tools

All used rulers, gauges, micrometers have to be calibrated due to metrological regulation.

For lowering the forces during dressing the parts to the pin use mounting paste LGAF3E, Molykote DX, Molykote G-n Plus, or eventually any other appropriate one.

3.3. Preparation

All parts must be precisely cleaned, without sharp edges and without damages. Damaged parts must be repaired and all sharp edges chamfered. Coarse (not machined) surfaces must be cleaned from impurities, dust, humidity etc.

It is required to secure the purity and no sharp edges of threaded holes. All protective and anticorrosion layers must be removed from the shaft.

3.4. Shaft Check

The proper length and shape of the shaft is controlled with the gauge (fig. 1). Take a special care for shaft mount face.

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*Заличено на основании
Регистрации 2016/1649*



ZKL VÝZKUM A VÝVOJ, A.S.
OSVĚTĚNÝ SKRUP

MOUNTING INSTRUCTION MN 03/12

Rev. 2

Contact: support@zkl.cz

Date: 20. 04. 2016

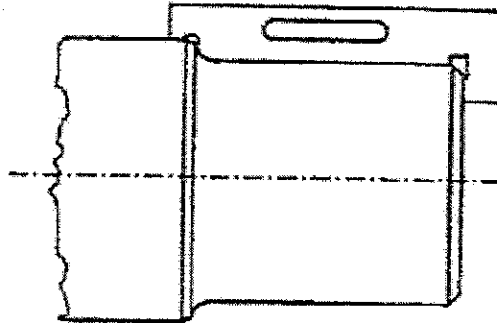


Fig. 1

Shaft is controlled with steel ruler to check for the damages and scratches. Control with a flashlight is to be performed (fig. 2a). Steel ruler must not collide with the surface rough faces (must move smoothly over the shaft) (fig. 2b).

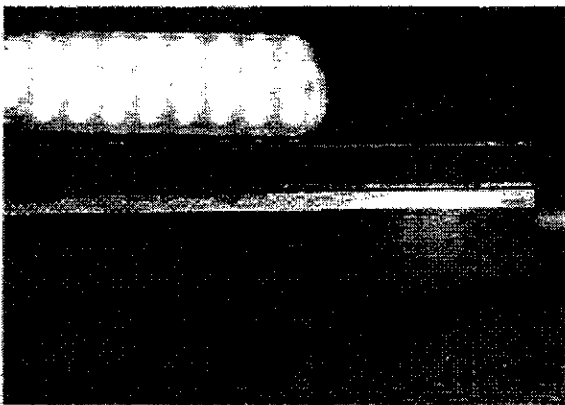


Fig. 2a

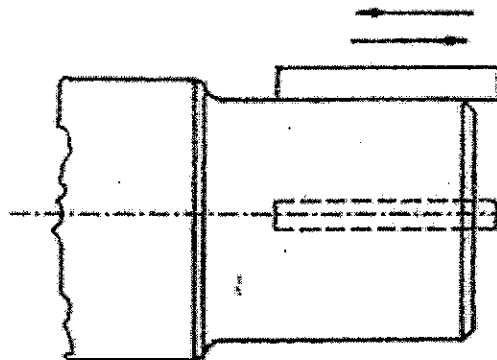


Fig. 2b

Shaft diameter is measured in four cross sections and in two planes perpendicular to the shaft axis (fig. 3). The measured values are to be recorded into the mounting record and must not exceed the design values.

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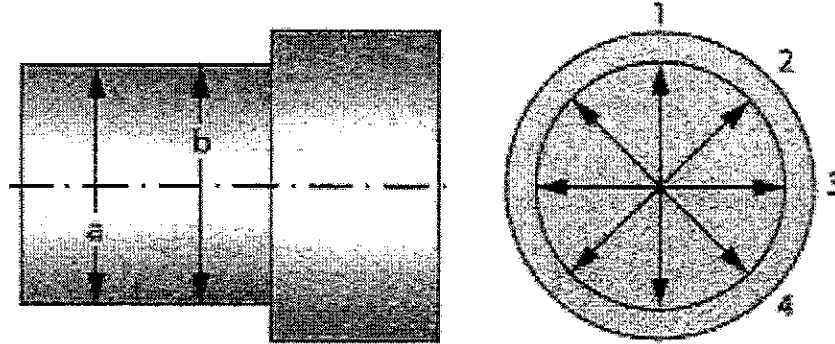


Fig. 3

Use the micrometer to check the cylindrical part of assembly where thrust ring is placed ($\varnothing d_1$). Compare the values with the drawings.

Tolerances of surfaces of pin and housing

| Part | Diameter tolerances according to ISO 286-1 ISO 286-2 | Geometrical tolerances according to ISO 68-1-485 |
|-------------------------|--|--|
| pin $\varnothing d_1$ | i7 | 7 |
| pin $\varnothing d$ | p6 | 5 |
| housing $\varnothing D$ | H7 | 6 |

3.5. Housing and Thrust Ring Check

Check the housing dimension of $\varnothing 240 H7$ and $\varnothing 189 H11$. Other abutment dimensions of the housing are to be checked using the statistical methods. Roundness of the hole of housing must not exceed 50% of the diameter tolerance.

Before check all the surfaces must be cleaned.

Bearings, bearing housings and accessories must be protected against moisture and dirt during storage, inspection and during installation.

The hole for the bearing rings is to be measured at four planes in the two perpendicular directions (fig. 4).

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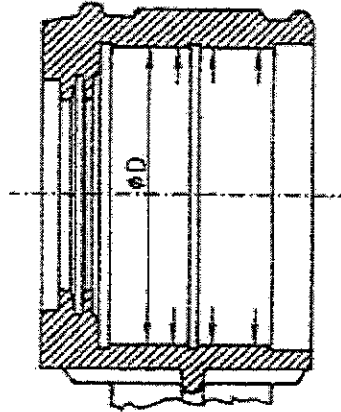


Fig. 4

The depth of the hole from the upper face to the lower end is to be measured by depth gauge or using the template.

At support ring the hole diameter " $\varnothing d_2$ " is to be checked and also the distance between the inner and outer supporting face "b". It is important that abutment faces are parallel and perpendicular to the hole 'diameter D_2 ' (Fig.5).

Measured values and tolerances must be with accordance with the drawings

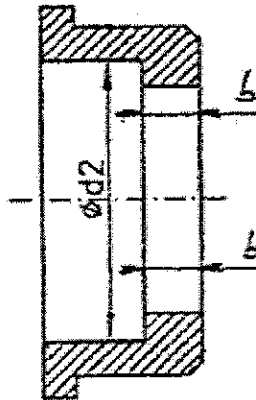


Fig. 5

4. MOUNTING

Bearing installation must be performed by trained personnel.

By bearings with the damaged packaging it is necessary to invite representatives from the manufacturing plant to check whether there is damage at the functional areas.


Bearings with the damages exceeding the limit must not be mounted. The limits are mentioned in annex 2.

The bearings must be handled with care, especially after removal of the inner rings for mounting on the pin.

When handling the outer rings it is required to avoid any contact with other parts that could cause the damage to the rollers and cage, especially this care must be taken when dealing with the bearings with polyamide cages.

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All bearings and accessories must be before and during installation protected against moisture and dirt. Space reserved for assembly must be kept clean, protected against dust and moisture.

4.1. Mounting of the Bearings

If all components are thoroughly cleaned and free of burrs, checked, and are in accordance with all requirements and the workplace is equipped with all the necessary tools, it is possible to initiate the assembly. Unpack the bearings from the packaging immediately before mounting. It is not necessary to remove the preservative packaging oil.

4.2. Mounting Procedure

1. Mount the supporting (shoulder) ring onto the pin

Mounting surfaces are to be covered with the thin layer of mounting paste LGAF3E, Molykote DX, Molykote G-n Plus, or eventually any other appropriate one. (see pt. 4.2) for reducing the risk of scratching and contact corrosion.

Heat the shoulder (abutment) ring to 120 – 150°C and slide it to the pin at its position and put it on the right place with the sleeve (Fig. 6a). The state after mounting is visible on Fig. 6b.

It is recommended to use the inductive heating or to heat the ring in the appropriate oil or by hot air in electric oven.

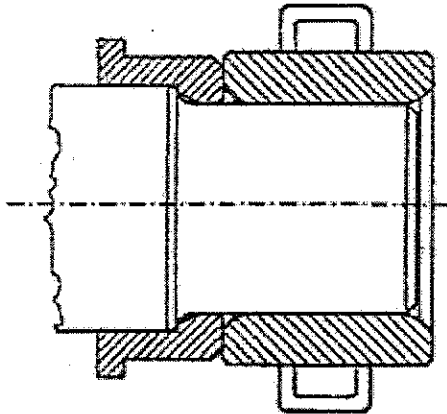


Fig. 6a

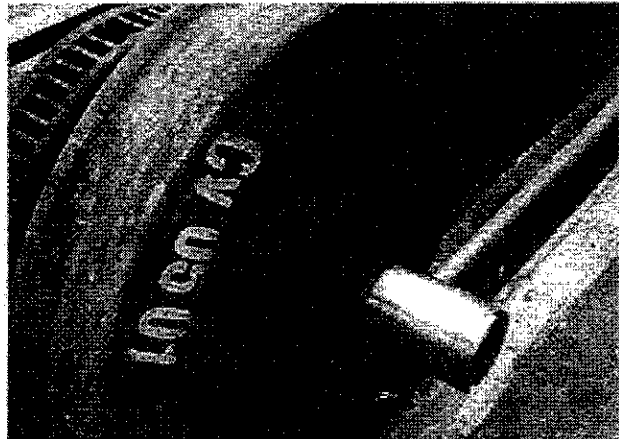


Fig. 6b

3. Put the thin layer of mounting paste to the pin free area and the front face of the support ring for lowering the forces during mounting and for avoiding the contact corrosion.

4. Mount the inner rings – preheated to 80 – 110°C onto the pin. It is recommended to use the inductive heating or to heat the ring in the appropriate oil or by hot air in electric oven. The temperature must not exceed 120°C in any case.

As first mount the inner ring with the internal, not separable flange (NJ design), the flange must face the shoulder ring without any clearance. (Fig. 7)

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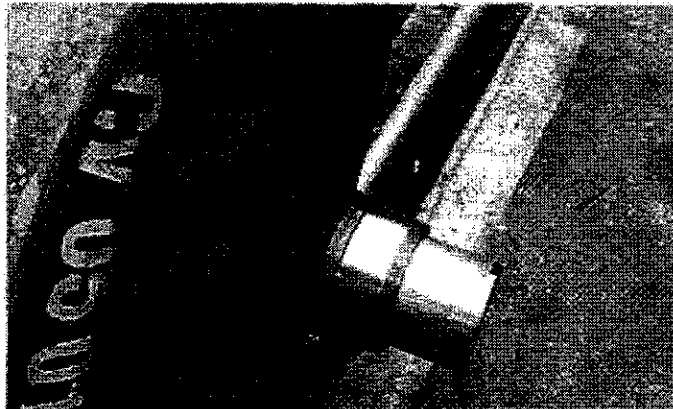
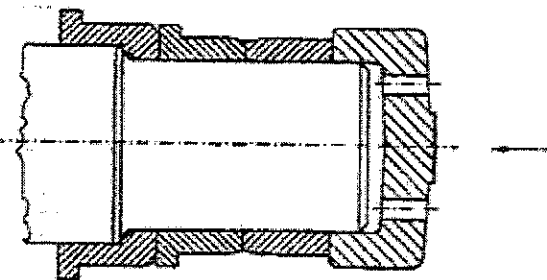
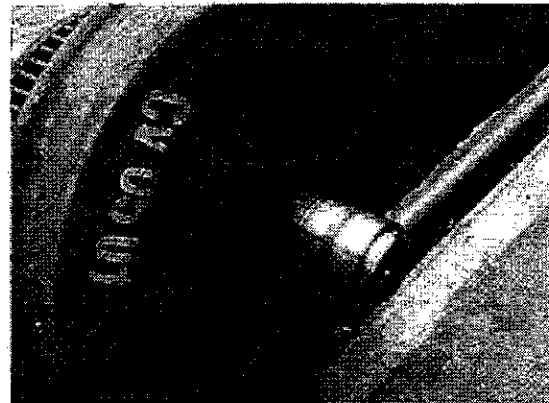


Fig. 7

5. Use the same way to mount the second inner ring as fast as possible. The wider face (without the chamfer) faces the outside of assembly. Then it is needed to wait before the inner rings cool down. Then face all the rings to each others, there must be no clearance between the faces. Mounted state at the Fig. 8 a and b.



Obr. 8a



Obr. 8b

During using the punching sleeve it is necessary to take care about its wear and damage, mainly at the front surface – punching (mounting) face. Any damages must be immediately repaired or the new sleeve must be used. Damaged sleeve in use could lead to damages at the ring

6. Check how the front faces are facing each other with the feeler gauge 0,03 mm.

7. The housing – when there is a groove for the textile seal in the bearing housing it is necessary to prepare the sealing for this groove and then to soak the seal for 24 hours in prescribed fluid.

The seal Leeds to be fitted in the groove same all around the diameter, it is recommended to use the tooling. The connection at the sealing must face up.

Cover inner diameter and the faces of the housing with the mounting paste to avoid the risk of contact corrosion with the rings.

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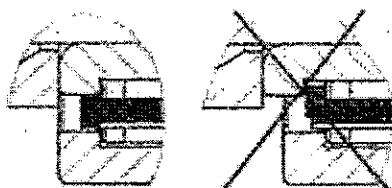
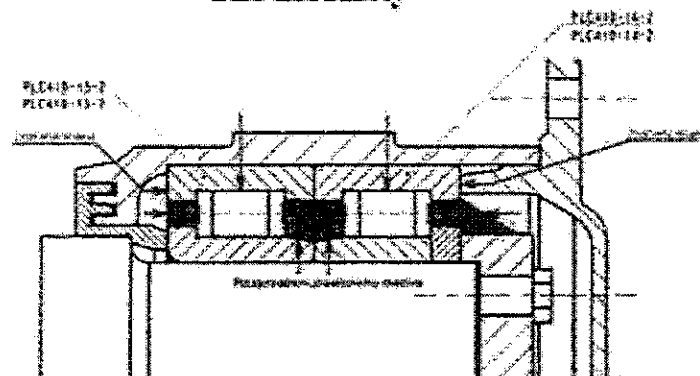
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8. Outer rings with rollers and cages (bearing subassemblies) are to be mounted without using much force into the bearing housing – unmarked faces must face each other.

Warning: In the case of non-compliance with this condition the bearings with asymmetrical polyamide cage can face the damage of the cage.

All axle roller bearings with brass and polyamide cages are currently supplied only with symmetrical cages in which the damage by reversing the orientation is not possible. Caution is especially valid for the eventual installation of bearings PLC 410-13.2/14.2 and PLC 410-15.2/16.2 with polyamide cage of blue color that has been at storage for a longer time.

The assembly



Proper mounting

Fig. 9

In case that the outer rings are produced at maximal value of the tolerance and the housing is produced at the minimal dimension it is possible to place the rings into the housings that are pre heated to 60 – 80°C. During mounting it is necessary to use the polyamide hammer.

9. Any gaps between the rollers, raceways and cages are to be filled with grease.

Grease type for the operation determines the operator with the agreement of the manufacturer. The lubricant must meet the requirements of ISO 12 081.

Recommended lubricants: ZKL LV 2 EPS, ZKL LV 2 EP Shell Alvania EP2.

Grease quantity for machine lubrication is 0.6 kg for manual lubrication from 0.6 to 0.7 kg.

Places that should be filled with grease are at Fig. 8.

10. Mounting of the housing onto the pin and the cover mounting

For simplification of mounting it is suitable to use the mounting tools. The design of these tools is shown at annex 1.

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MOUNTING INSTRUCTION MN 03/12

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Method A - The recommended method of assembling using a plastic tool according to the drawing NC-1964, which is inserted into the bearing housing assembly with the outer bearing rings in way that the wider diameter is on the outer side of the housing. Bearing housing before mounting onto the pin must be positioned to the axis and then carefully pull the chamfer of mounting tool (ϕ D1) onto the axle. After trimming the front face of the mounting tool to the inner ring carefully push the assembly of bearing housing onto the pin with inner rings that are covered with prescribed grease. Push until the front faces of the rollers of the rear bearing abut against the flange of the inner ring. Doing so will eject out the mounting tool out of the assembly.

Method B - Alternative mounting method is to use the mounting tool with the guidance cone according to the drawing NC-1871_1. Slide the guide ring at the end of the pin and the housing with the outer rings is set one axis with the axle. Then freely push the assembly onto the pin with inner rings that are covered with the grease. Push until the faces of the rollers of the rear bearings abut against the flange of the inner ring.

When pushing the subassembly onto the axles pin with the inner bearing rings it is necessary that the housing is pivoted to prevent abrasion, deformation, respectively damage of the raceways.

Mount the retaining ring onto the pin with marked face facing out and then is fixed with the flange with retaining plate and screws as prescribed at the drawings.

Locking screws of the flange need to be tightened by the torque wrench.

The torque is:

200 ± 20 Nm

By folding the locking metal sheet onto the outer faces of hexagonal screw heads secures the screws from loosening. During folding it is necessary to prevent impurities to come into the bearing space. Axial clearance of the pair of mounted outer rings against the pair of tight inner rings must be 0,3 – 0,9 mm .

Cleaned cover is then equipped with the O ring and the flange is screwed with the M16x50 screws with washers 16. Torque:

100 ± 20 Nm

After mounting check the free station of bearings.

Sealing of the housing and possible marking with the identification label of the mounting plant is to be done according to the valid technical conditions and delivery conditions and according to valid drawing documentation.

On the label there must be written the clear identification of a mounting plant, date of the mounting, and the number of the axle.

Other works associated with the wheelset and housings are secured by prescription of the railway providers and prescriptions of the rail vehicle manufacturers. It is necessary to secure no damage at the functional surfaces during manipulation, storage and transport, including the corrosion protection.

Wheelsets is to be put into operation as soon as possible.

5. DISMOUNTING AND THE MAINTENANCE OF THE WHEELSET BEARINGS

Inspection procedure

- Chamber clearing – from outsider with the iron wire brush and the with the solvent
- unscrew 4 screws of the cover flange, remove it and remove the grease from the front part of the chamber
- unscrew screws of the cover and remove it, then remove the retaining bearing ring
- dismount the housing with outer rings, cages and rollers, during this swing with the housing

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- push out the outer rings with rollers and cages from the assembly
- wash all the components and storage them at a clean dust and moisture free place

Under normal operating conditions the roller bearings housings do not need any special maintenance.

6. FURTHER REQUIREMENTS

Workers who assemble the bearings into the bearing housings and on the wheel set must be trained in the art of rolling bearing mounting.

Installation instructions for mounting the bearing units ZKL must be during the assembly available to all personnel involved in installing the bearings.

The place where the bearing units are mounted must be approved by the manufacturer of bearings. Bearing manufacturer is authorized to check those places.

7. VALIDITY

These installation instructions are valid for single row cylindrical roller bearings: PLC 410-13 / 14, PLC410-13 / 14-2, PLC410-15 / 16 PLC410-15 / 16-2 and PLC410-33 / 34-2 from the manufacturer ZKL Brno which are mounted in bearing housings and axles for railway applications according to valid drawing documentation approved by the operator and the manufacturer of bearings.

8. CHANGES

Changes and additions in these installation instructions can be done by the creator.

9. ANNEXES

| | | | |
|------------------------------------|-----|-----|---------|
| Annex. 1 – mounting tools | | | |
| Mounting tool dr.nr. NC-1964 | ... | ... | str. 14 |
| Mounting tool dr.nr. NC-1871_1 | ... | ... | str. 15 |
| Annex. 2 – Allowed surface defects | | | |
| ... | ... | ... | str. 16 |

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Annex. 1 / NC-1964

DETAIL A

| ROZMĚR | PLC410-15/16 | PLC410-33/34 | PLC410-13/14 |
|---------|--------------|--------------|--------------|
| D1 | ø130 | ø130 | ø120 |
| D2 | ø159 | ø157 | ø150 |
| +TOL D2 | -0.135 | -0.135 | -0.120 |
| +TOL D2 | -0.160 | -0.160 | -0.140 |
| D3 | ø190 | ø190 | ø90 |
| D4 | ø170.5 | ø167.8 | ø160.8 |

MONTÁŽNÍ PŘÍPRAVEK URČENÝ PRO LOŽISKA ZKL S MOSAZNOU I PLASTOVOU KLEČÍ:
 PLC410-15/16; PLC410-33/34; PLC410-13/14

HRANY ZAOKLIT R1

| | | | | |
|-------------------|--------------------|----------|--------------|------------------------------|
| Material | Pař. PA66 | Material | Material | Význam a význam, za kromě |
| Electr. Prop. | Pař. Pař. | Material | Material | |
| Elektr. Prop. Vše | Pař. Pař. | Material | Material | |
| Klasifik. Průřez | Pař. Pař. | Material | Material | |
| Průřez | Pař. Pař. | Material | Material | |
| Název zařízení | NAPRAVOVÁ LOŽISKA | | Stav výřezu | Název výřezu |
| Společnost | MONTÁŽNÍ PŘÍPRAVEK | | Číslo výřezu | NC-1964 |

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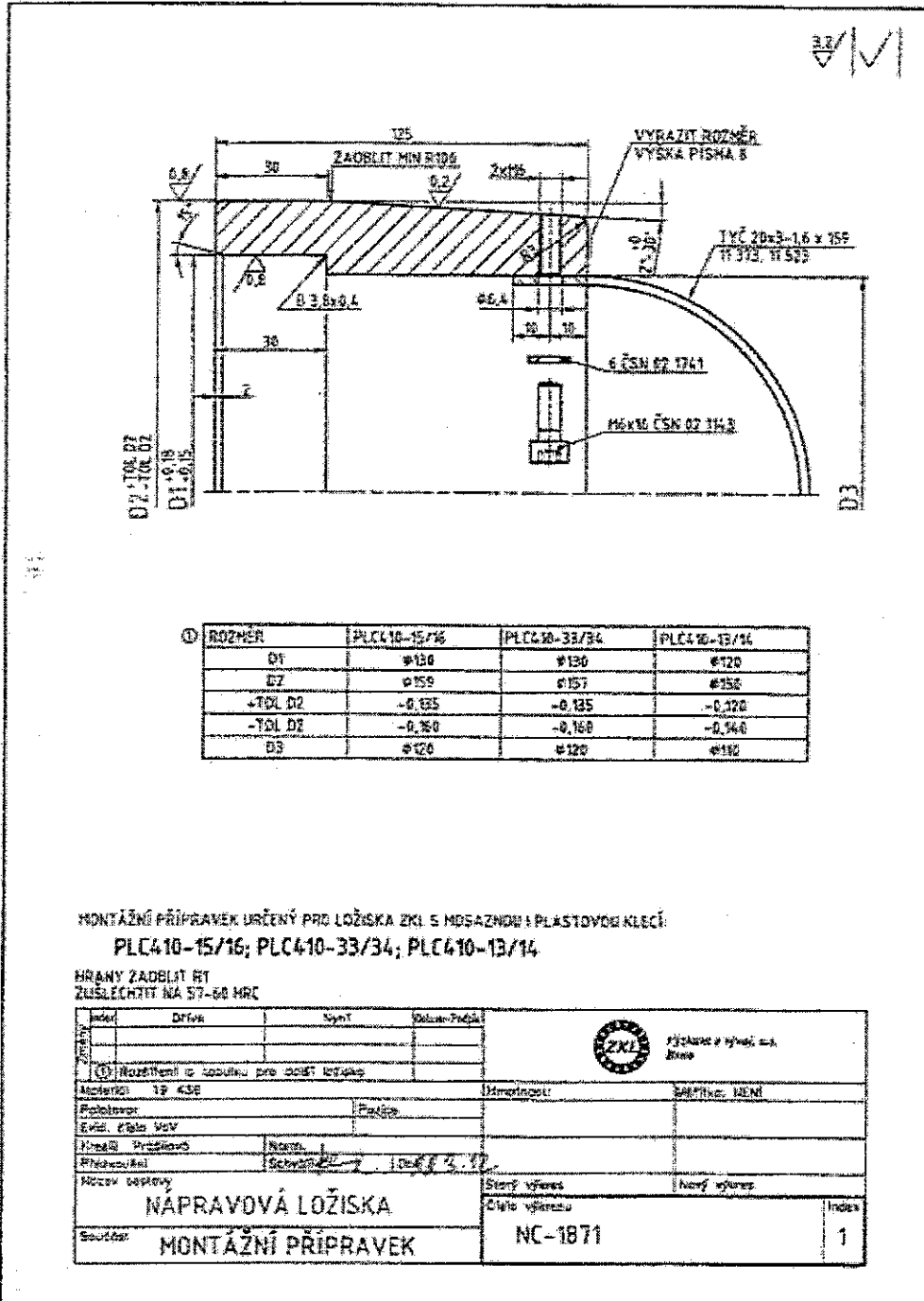
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Annex. 1 / NC-1871_1



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Annex. 2 / Permissible surface defects

Table 1. Permissible surface defects at the raceways

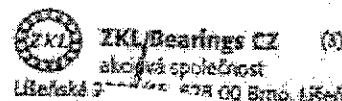
| Maximal size of defect | Placed on raceway | | Defect count |
|--|-----------------------------|-------------------------------|---|
| <u>Dot</u> diameter 0,1mm depth 1,5µm <u>Coma</u> length 1mm width 0,1mm depth 3µm | Cylindrical roller bearings | Rings with retaining rings | Middle area - 2/3 of roller length 3 |
| | | | Outside the middle area 5 |
| | | Rings without retaining rings | 15 |
| Minimal distance between defects: 1 mm | | | |

Table 2. Permissible surface defects at the rollers

| Defect | | Placement | Defect count | Minimal dist. btw defects |
|--|---|---------------|--------------|---------------------------|
| Type | Size | | | |
| Scar, groove, bruising (smooth surface, Metal - clear) | length max. 0,6 mm for diameter over 12 mm depth max. 3µm | raceway | 6 | 3 mm |
| | | face | 6 | 1 mm |
| Traces after finishing (clean grooves, lines) | Not detectable by touch of microlocator with the spike curvature 0,5 mm | Raceway, face | No limit | No limit |
| Hole with dark bottom after etching | Max. size 0,2 mm | face | 3 | 2 mm |

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