BEARING MOUNTING

IMPORTANCE OF PROPER MOUNTING PROCEDURES

- Ensure safety
- Simplicity and speed the process
- Using full bearing capabilities
- Get the longest possible bearing life
- Prevent rings from turning on

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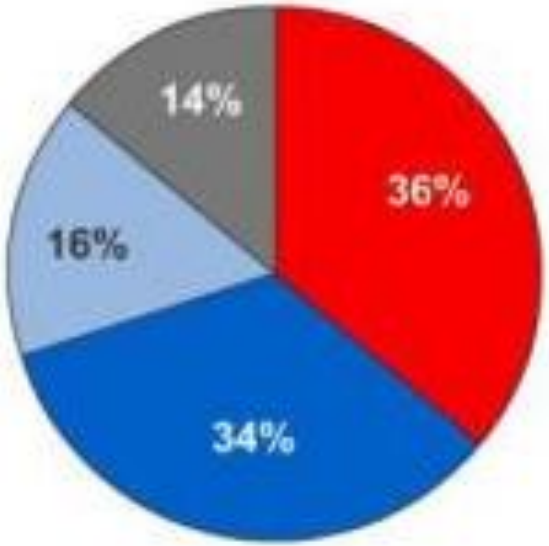
FACTORS CAUSING BEARING FAILURE



- Poor Lubrication 36%
- Fatigue 34%
- Improper mounting 16%
- Contamination 14%

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INSTRUCTIONS FOR BEARING MOUNTING

- **Preparing of assembly elements for mounting**

We recommend that mounting method to include :

- ✓ Checking of the assembly components (dimensional, form, surface quality), such as:
  - -Shaft
  - -Housings
  - -Axial fixing elements
  - -Sealing
- ✓ Clean surrounding elements (clean environment);
- ✓ Use of correct mounting procedures;
- ✓ Check if bearing is mounted correctly;
- ✓ Operating test.

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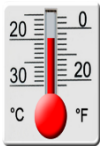
INSTRUCTIONS FOR BEARING MOUNTING

Important rules !



Working temperature: 18-22°C

Humidity: max. 60%

Sweat hands can cause bearing corrosion

Use tools in good condition

Keep Tools organized

In mounting rooms don't have to exist:

- Grinders
- Dust sources
- Vibrations

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INSTRUCTIONS FOR BEARING MOUNTING

- ***BEARING* preparing**

➢ NEW Bearings: (original packing)

-Protected against corrosion;
-No need to remove preservative (washing);
-**Remove packing in the same day of mounting !**

➢ OLDER Bearings:(damaged packing, older than 2 years, reused bearings)

-Checking bearing aspect;
- Washing in diesel/mineral spirt (2x);
- Measure d, D, B, clearance.
-Remove of corrosion smaller than 5 mm (forbidden on raceways !)
-Don't rotate the bearing before washing !

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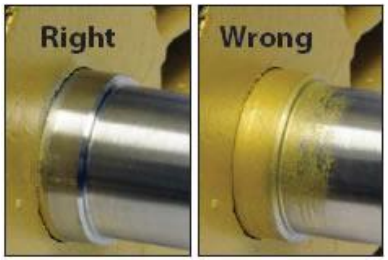
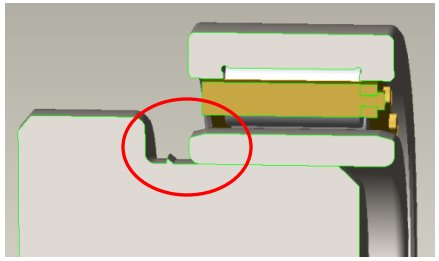
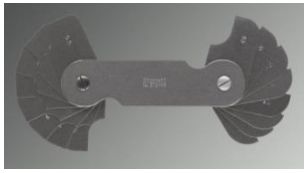
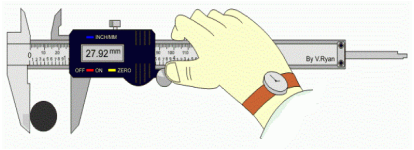
INSTRUCTIONS FOR BEARING MOUNTING

- ***SHAFT* & HOUSING preparing**









- Mounting surfaces should be clean and smooth
- No hit signs
- No burrs (use rasp and clean)
- No corrosion signs
- Measure shaft/housing diameter, ovality, tapering
- Measure mounting radius (radius gauge)

FORBIDDEN TO:

-Mount on shafts with smaller diameters!-> (ring will turn)

-Mount on shafts with bigger diameters! ->(no clearance)

Bearings. Tolerance class	Shaft. Diameter d, mm			Housing. Diameter D,mm		
	≤ 80	>80...500	> 500	≤ 80	> 80... 500	> 500
	Roughness R_a [µm].					
P0, P6X and P6	0,8 (N6)	1,6 (N7)	3,2 (N8)	0,8 (N6)	1,6 (N7)	3,2 (N8)
P5, SP and P4	0,4 (N5)	0,8 (N6)	1,6 (N7)	0,8 (N6)	1,6 (N7)	1,6 (N7)
P2 and UP	0,2 (N4)	0,4 (N5)	0,8 (N6)	0,4 (N5)	0,8 (N6)	0,8 (N6)

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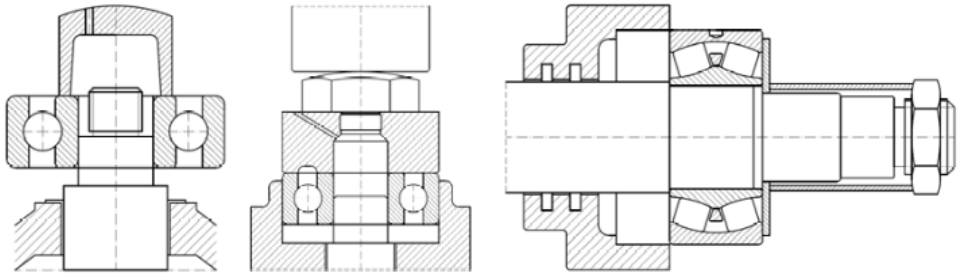
INSTRUCTIONS FOR BEARING MOUNTING

- ***Devices for bearing mounting***

  Mechanical tools – (cold mounting)



FOR:

- Cylindrical Bore

- Bearing with d< 50 mm (small pressing forces)

Fitting tool

Rule: Forces shouldn't be transmitted through rolling elements!

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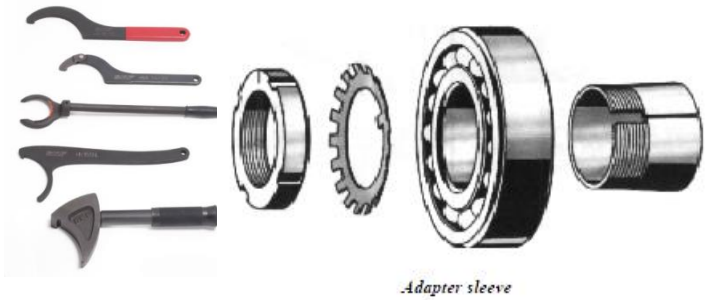
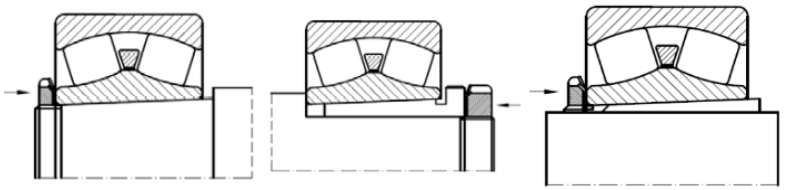
INSTRUCTIONS FOR BEARING MOUNTING

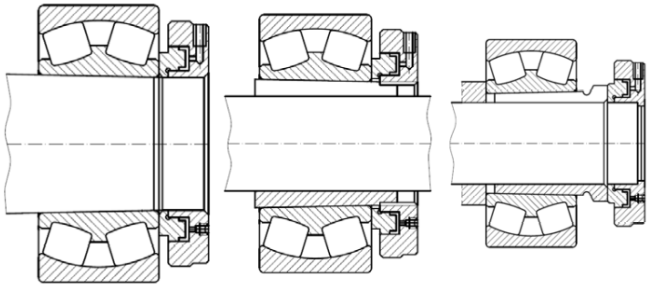
- ***Devices for bearing mounting***

FOR:
- Tapered Bore
- Small & Medium Bearings





Hooke spanner; Impact spanner



FOR:
- Tapered Bore
- Large Bearings

Hydraulic nut and pump

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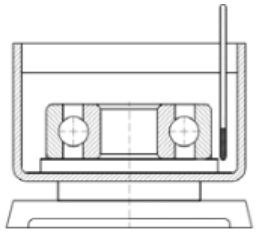
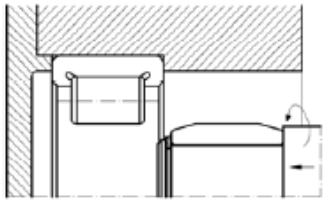
INSTRUCTIONS FOR BEARING MOUNTING

- ***Devices for bearing mounting***



Oil bath

Electric heating plate



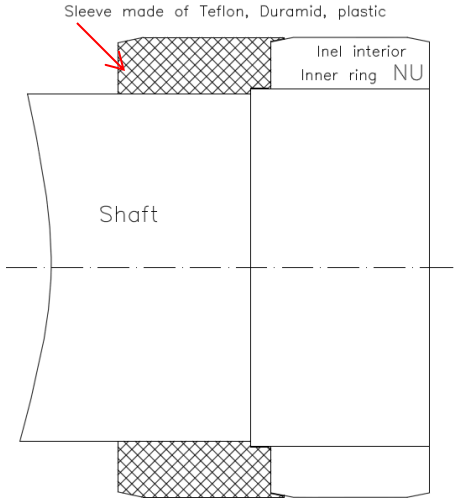
FOR:

- *Medium & Large Bearings (d>50 mm)*
- *Cylindrical/spherical roller bearings*
- *Separable bearing elements*

! Rotate ring

! Use mounting sleeve

Induction heater



Remember: - Don't heat bearings over 110°C !
- Don't force elements during mounting !
- Don't heat bearings with open flame !

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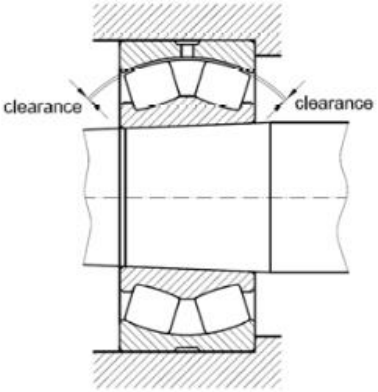
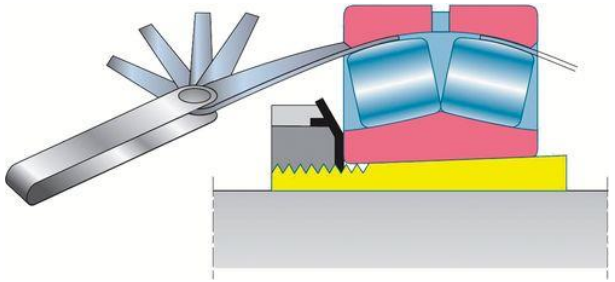
INSTRUCTIONS FOR BEARING MOUNTING

- ***After the mounting …***

Check : *- if bolts have been well tight*
- bearing radial clearance
- bearing rotation by hand (if possible)





- ***Operational test***

A good bearing mounted, should have:
- *no strange noise;*
- *no high temperature;*
- *no vibration;*
- *no lubricant leakage;*
- *no other defects.*

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INSTRUCTIONS FOR BEARING MOUNTING

- ***Lubrication effects:***

- Reduce friction
- Dissipating heat and cooling
- Seals (from contamination)
- Corrosion protection
- Extends fatigue life

Oil advantages:

- *Good results at high temperatures; can be cooled*
- *Many ways to feed the bearing (pressurized systems, oil bath, oil mist)*
- *Cleaner - Can be used a system that can collect foreign particles (filters);*

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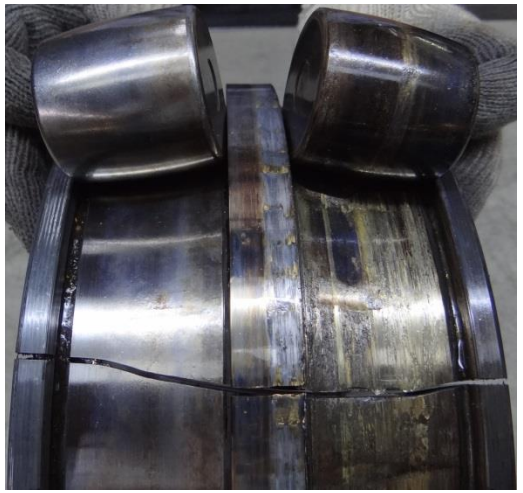
INSTRUCTIONS FOR BEARING MOUNTING

- *Failures due to **Lubricant :***



Defect: Failure. Inner ring Crack
Cause: Greasing only on one side
Countermeasure: Grease both sides

Right = Ungreased side
Left = Greased Side

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INSTRUCTIONS FOR BEARING MOUNTING

- *Failures due to **Lubricant contamination:***

Defect:
- Abrasive Wear.

("Frosty" appearance).

Causes:
- Lubricant contamination with abrasive materials, or ingress of abrasive particles from surrounding components.

Countermeasures:
- Improve system cleanliness.

Abrasive wear on rollers raceway.

Abrasive wear on outer ring raceway (SRB).

Defect:
- Corrosion;
- Lubricant contamination with water.

Causes:
- Moisture penetration;
- Wrong sealing.

Countermeasures:
- Improve sealing;
- Use of anticorrosion additives.


Corrosion. Contamined lubricant.

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INSTRUCTIONS FOR BEARING MOUNTING

- *Failure:* ***Fatigue***

Defect: Flaking. Repeated stresses developed in the contacts elements=Fatigue
Cause: Structural changes and fatigue cracks, originating in the loaded zone, due to load cycles.
Countermeasure: Use a bearing with higher load carrying (if longer life is required)

Normal wear pattern.

Flaking due to vibration (equally spaced at roller pitch).

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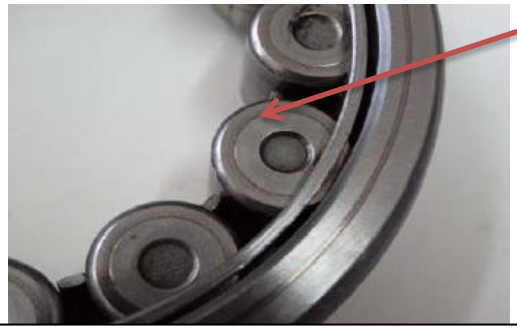
INSTRUCTIONS FOR BEARING MOUNTING

- *Failure due to **Mounting***

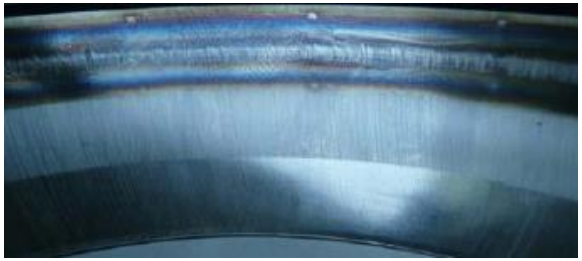
Defect: Roller end side and flange wear.
Cause: - Axial overloading;
- Shaft deflection
Countermeasure: Check and correct axial clearance of mounted bearing



Defect: Overheating. Seizure. Uneven wear.
Cause: - Overloading of one raceway;
- Small radial clearance
Reason: Improper heating of inner ring.
Countermeasure: Use proper mounting tools

Inner diam. (d)

Inner ring raceway



Outer ring raceway

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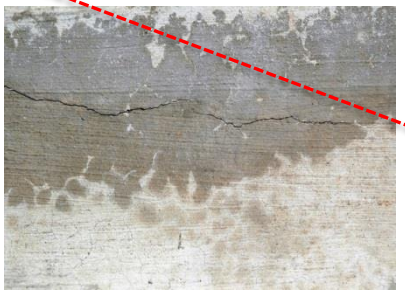
INSTRUCTIONS FOR BEARING MOUNTING

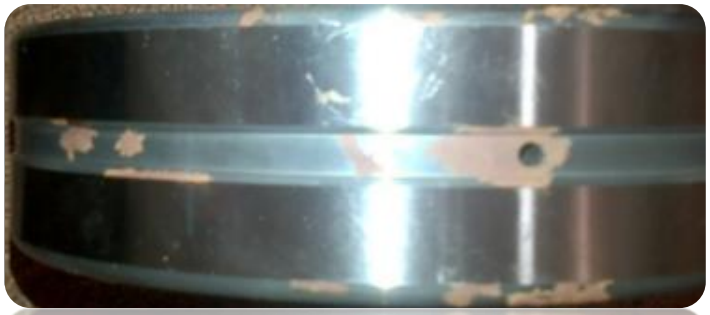
- ***Storage of bearings …***

Bearings must be - stored on special shelve, on horizontal position.
- in rooms with low humidity (max 60%)
- ventilated place

- ***Forbidden to…***

- Store bearings directly on the ground!
- On shelves from green lumber (undried wood) !
- Near to cold and wet walls !





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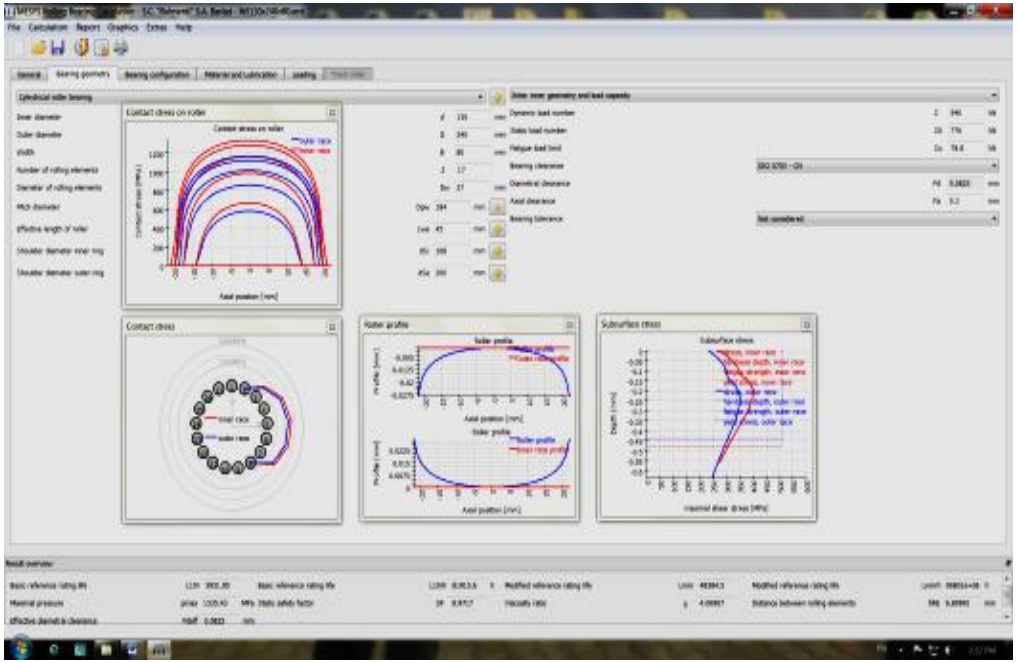
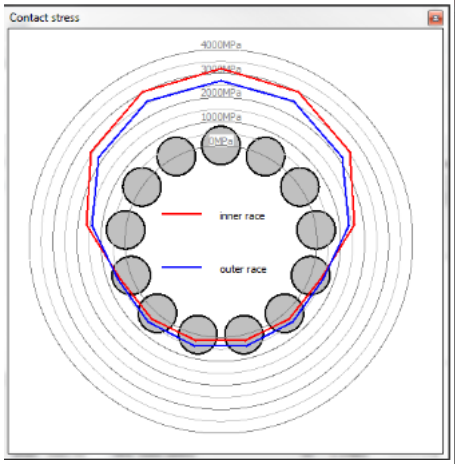
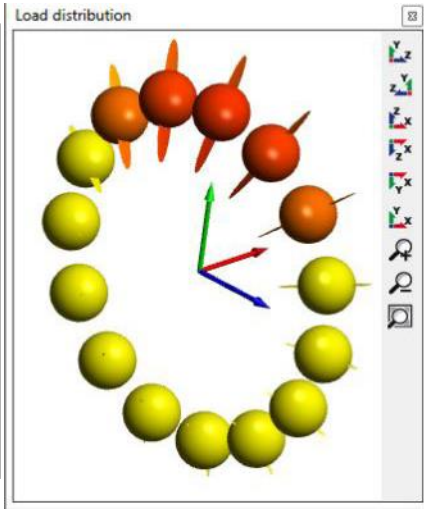
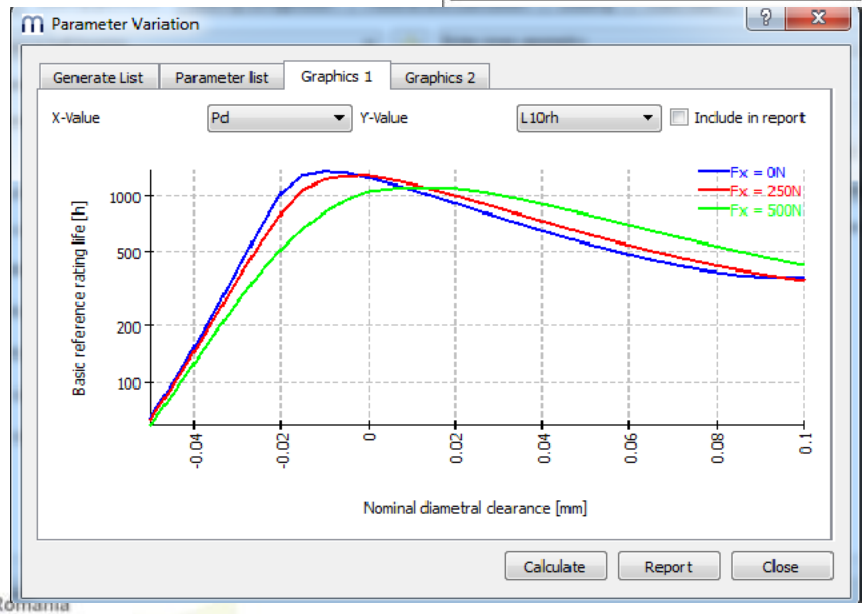
NEWS - Mesys - Life / Stress Calculus









Mesys RBC Rolling Bearing Calculation.

- *calculates reference life, modified reference life.*
- *fast and precise computing of loads, efforts and lubricating conditions;*
- *calculation of the characteristics of all the bearing types.*

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CERTIFICATES

ROMÂNIA
MINISTERUL TRANSPORTURILOR
AUTORITATEA FEROVIARĂ ROMÂNĂ – AFER
AUTORIZAȚIE
DE FURNIZOR FEROVIAR
Seria AF Nr. 6368

Lloyd's Register LRQA
CERTIFICATE
awarded to
S.C. RULMENTI S.A. BARLAD
Republicii 320
731108 BARLAD
Romania
LRQA Centre Lloyd's Register Quality Assurance Limited
International Railway Industry Standard (IRIS)
Revision 02, May 2009
Certificate valid from: 16/12/2013
Certificate valid until: 15/12/2016 *
IRIS Certification

LRQA Business Assurance
CERTIFICATE OF APPROVAL
RULMENTI S.A. BARLAD
731108 Barlad, Republicii Street, No. 320, Vaslui County
Romania
ISO/TS 16949:2009 (excluding product design)
Manufacturing of bearing components.
Approval Certificate No: BUC6016494
Original ISO/TS 16949 Approval: 24 May 2013
Current Certificate: 24 May 2013
Certificate Expiry: 23 May 2016

- **Romanian Railways Authority (AFER)** – right to sell critical railway products (ball and roller bearings). Valid until 23.07.2019.
- **IRIS (International Railway Industry Standard)** – Design and development, manufacturing of rolling bearings and bearings components. Valid until 15.12.2016.
- **ISO/TS 16949** – Manufacturing of bearing components (excluded design), Lloyd's Register QA, Valid until 23.05.2016

CERTIFICATES

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

RULMENTI S.A. BARLAD
320 Republicii St., Barlad, Vaslui County
Romania

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:2008

The Quality Management System is applicable to:

Design, research and development, production, sales and service of ball and roller bearings. Production in co-generation and supply of electricity and thermal energy.

Approval Certificate No: BUC6013156
Original Approval: 23 September 2011
Current Certificate: 23 September 2014
Certificate Expiry: 22 September 2017

Issued by: Lloyd's Register (Romania) S.R.L.
For and on behalf of Lloyd's Register Quality Assurance Limited.

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Occupational Health & Safety Management System of:

RULMENTI S.A. BARLAD
320 Republicii St., Barlad, Vaslui County
Romania

has been approved by Lloyd's Register Quality Assurance to the following Management System Standards:

OHSAS 18001:2007

The Occupational Health & Safety Management System is applicable to:

Activities including and associated with:
Design, research and development, production, sales and service of ball and roller bearings. Production in co-generation and supply of electricity and thermal energy.

Approval Certificate No: BUC6013158
Original Approval: 29 September 2011
Current Certificate: 15 September 2014
Certificate Expiry: 28 September 2017

Issued by: Lloyd's Register (Romania) S.R.L.
For and on behalf of Lloyd's Register Quality Assurance Limited.

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Environmental Management System of:

RULMENTI S.A. BARLAD
320 Republicii St., Barlad, Vaslui County
Romania

has been approved by Lloyd's Register Quality Assurance to the following Environmental Management System Standards:

ISO 14001:2004
SR EN ISO 14001:2005

The Environmental Management System is applicable to:

Activities including and associated with:
Design, research and development, production, sales and service of ball and roller bearings. Production in co-generation and supply of electricity and thermal energy.

Approval Certificate No: BUC6013157
Original Approval: 22 September 2011
Current Certificate: 09 September 2014
Certificate Expiry: 21 September 2017

Issued by: Lloyd's Register (Romania) S.R.L.
For and on behalf of Lloyd's Register Quality Assurance Limited.

- **ISO 9001:2008** - Quality Management System, Lloyd's Register QA, Valid until 23.09.2017
- **OHSAS 18001:2007**– Occupational Health & Safety Management System. Lloyd's Register QA, Valid until 28.09.2017.
- **ISO 14001:2004, SR EN ISO 14001:2005** – Environmental Management System. Lloyd's Register QA, Valid until 21.09.2017