



**S.C. " RULMENTI" S.A. GROUP
BARLAD -ROMANIA**

**Cylindrical roller bearings for railway axleboxes
WJ + WJP design**



WJ+WJP 120/240 TNC4 and WJ 130/240 TNC4 bearings

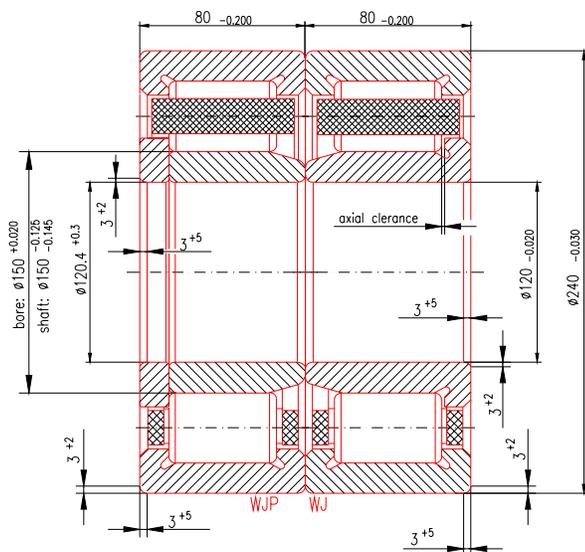
1. Description

Double-cylindrical roller bearings WJ/WJP design are manufactures specially dimensioned ISO bearings and standardized by UIC.

These bearings have polyamide cage and internal geometry has been optimised to further reduce edge stresses and to improve lubrication and load distribution.

The dimensioning is usually based on a calculated operating life of more than 3 million kilometers.

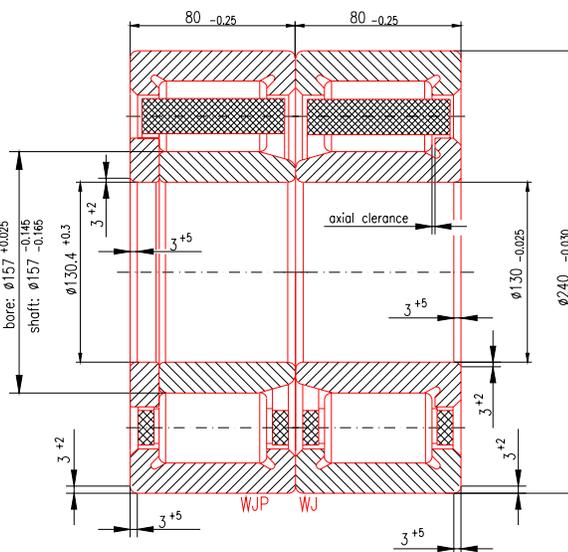
WJ+WJP120/240 TNC4



Cr = 946KN
 Cor = 1484KN
 for set
 P_{amax} = 69.1KN

- Speed limit in grease: 2400 min⁻¹
- Elements are interchangeable

WJ+WJP130/240 TNC4



Cr = 951 KN
 Cor = 1620 KN
 for set
 P_{amax} = 69.1KN

- Speed limit in grease: 2200 min⁻¹
- Elements are interchangeables

2. Types of wagons and locomotives to have used

Bearing

Type wagons and locomotives

WJ+WJP 120/240

Gorlitz IV-Germany double-decker wagon



Freight wagons with Y25 bogies



Passenger wagons with Minden-Deutz bogies



Postals and stocks wagons
Sleeper wagon 60.50 and 70.50, 19.50, couche 19.50, 20.50, 39.50



Gorlitz -Germany double-decker wagon



Bogies typ Gorlitz , light wagons series 29.20



Bogies typ Gorlitz V , modified sleeper wagons 1983-85



Motorailer on two axleboxes



Locomotive type LDH 450/700 CP (normal way)



WJ+WJP 130/240

Bogies for transposed (large way)



Electrical frame 1870 kW



Electrical frame 2720 kW



3. Marking of cylindrical roller bearings type WJ+WJP

Marking method : chemical or laser.

Marking for WJ+WJP120/240 TNC4:

Outer ring: WJ+WJP120/240TN, URB, ROMANIA, manufacturing month and year code, at 90°.
 Inner ring WJ: WJ120/240TNC4, URB, manufacturing month and year code, at 120°.
 Inner ring WJP: WJP120/240TNC4, URB, manufacturing month and year code, at 120°.
 Thrust washer: WJP120/240TNC4, URB, manufacturing month and year code, at 120°.

Marking for WJ+WJP130/240 TNC4:

Outer ring: WJ+WJP130/240TN, URB,ROMANIA, manufacturing month and year code, at 90°.
 Inner ring WJ: WJ130/240TNC4, URB, manufacturing month and year code, at 120°.
 Inner ring WJP: WJP130/240TNC4, URB, manufacturing month and year code, at 120°.
 Thrust washer: WJP130/240TNC4, URB, manufacturing month and year code, at 120°.

Manufacturing month and year is an alphanumeric code group (two letters for month and two digits for year) according following tables:

Manufacturing month code

Month	Code	Month	Code	Month	Code	Month	Code
january	IA	april	AP	july	IL	october	OC
february	FE	may	MI	august	AU	november	NO
march	MT	june	IN	september	SE	december	DE

Manufacturing year code

Year	Code	Year	Code	Year	Code	Year	Code	Year	Code
2002	02	2005	05	2008	08	2011	11	2014	14
2003	03	2006	06	2009	09	2012	12	2015	15
2004	04	2007	07	2010	10	2013	13	2016	16

4. Instructions of assembly

Selection and formation of pairs of bearings consideration of radial clearance to make respectively followings regulations:

The difference of radial clearances of two bearings mounted on same axle must not exceed 0.015 mm, with own inner ring. Using standard inner this difference may not exceed 0.01 mm.

In case of measuring the radial clearance directly on the axle the difference may not exceed 0.02 mm. Bearing inner rings carry circumferential load, therefore they are press-fitted: axle journal p6, housing H7.

Cylindrical roller bearings do not, however, compensate misalignment between axle and bogie frame. Therefore misalignment must be corrected by angular freedom of the housing.

5. Clearances of bearings for axleboxes wagons and locomotives

Bearing (set)	Group	Clearances before mounting [x 0.001mm]		Radial clearance reduction [x 0.001mm]	Radial clearances after mouting [x 0.001mm]
		radial	axial (set)		
WJ+WJP130/240 TNC4	C4	125...165	300...780	30...64	61...135
WJ+WJP130/240 TNC4	C4	145...190	660...1190	35...75	70...155

6. Methods of measuring and checking

The dimensional checking and measurement radial and axial clearances of bearings are according ISO/TR 9274 and ISO 5753 .

The radial clearance for bearings according 1A risk class is checked with passive control devices.

Parameter	Apparatus
Bore diameter (d)	Passimeter with division value 0.001 mm
Outside diameter (D)	Passimeter or with division value 0.001 mm
Width (B)	Passimeter or with division value 0.001 mm
Radial clearance	Feeler gauges
Axial clearance	Passimeter or with division value 0.001 mm

7. Recommended greases

Grease	Producer
CARRIER LZS-2EP	MOL-Ungaria
SHELL Alvania 2760 B	SHELL
INA LIS EP2	INA - Zagreb Croatia
Eldon's Letonia LR-2 EP	Eldon's Latvia

8. Axial and radial loads

These bearings are particularly suitable for supporting high radial loads with special internal constructions and polyamide cages.

The dimensioning is usually based on a calculated operating life of more than 3 million kilometers.

a) Radial loads:

Static axle load : 160 kN;

P-equivalent bearing load, kN;

$P = 0.5 \times f_0 \times f_1 \times G$ for two bearing axleboxes; $P = 104$ kN

were:

f_0 - factor to the variation in payload and can be set at $f_0 = 0.9$ to 1, for passenger rolling stock;

f_1 - factor of summarises the influence of the radial and axial dynamic loads, the values being determined by running speed, track conditions, wheel suspension and unsprung mass.

$f_1 = 1.2$ to 1.4 for passenger rolling stock;

G - maximum static axlebox load in kN; $G = 80$ kN;

b) Axial loads:

For WJ+WJP130/240: F_{ap} - maximum permissible axial load, kN; $F_{ap} = 11.8$ kN for a constant axial load, for short periods the values may be multiplied by 2;

$F_{a \max.}$ - axial limiting load, kN; $F_{a \max.} = 69.1$ kN

For WJ+WJP130/240: F_{ap} - maximum permissible axial load, kN; $F_{ap} = 11.2$ kN for a constant axial load, for short periods the values may be multiplied by 2;

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9. Laboratory test

Test is named Accelerated Life Test. The results are evaluated according to 90% criterion of reliability. Test schedule is applied to a lot of 30 brgs., from which are tested 20 brgs. The test is running until 8/10/20 fatigue failures (pitting on raceways) occurs, and the results are statistically estimated with the maximum-likelihood method. Test parameters (speed, lubrication, load) are calculated theoretically for each type of brg.

The rigs can test the performance and durability of two bearings simultaneously under identical conditions. The radial load can be applied by hydraulic pistons.

In our laboratory make followings types tests:

- tests for confirmation of basic dynamic load rating or rating life estimation for bearings from currently manufacture;
- tests of rating life required by customers;

- tests on research problems (for verification teoretically aspects with regard to design bearings);

10. Dismounting of the inner ring

Dismounting the inner ring of bearing with induction heating.

For this particular bearing and application, the induction heating coils are normally used to dismount inner ring.

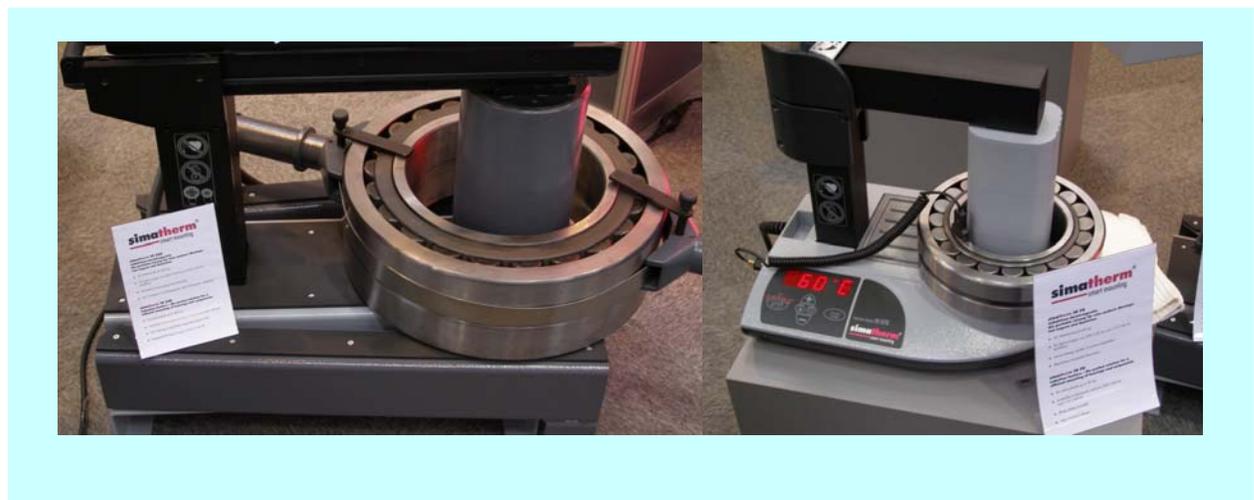


with

are

11. Instrumentation and tools for maintenance

- heating equipment;
- extraction devices;
- high - pressure pumps for hydraulic systems;
- fitting devices;
- multi-plate presses;



12. Preservation

The preservation of bearings make according SF 24006/2008 using of Castrol Rustilo DWX33 solvent with quaranty period protection for two years.

A high quality soft film rust preventive, on evaporation of the solvent, leaves a powerful protective film.

Before of preservation the bearings must to be washed with Shell Callina 2402, petroleum solvent.

13. Utilizable standards

- EN 12080 - Railway applications - Axleboxes - Rolling bearings;
- EN 12081 - Railway applications - Axleboxes - Lubricating greases;
- EN 12082 - Raiway applications - Axleboxes - Performance testing;

UIC 510-1 - Wagons - Running gear - Normalisation;

UIC 510-2 - Trailing stock: wheels and wheelsets. Conditions concerning the use of wheels of various diameters;

UIC 510-3 - Wagons - strength testing of 2 and 3 axle bogies on test rig;

UIC 515 - Passenger rolling stock - Trailer bogies - Running gear;

UIC 814 - Technical specification for the official testing and supply of greases intened for the lubrication of railway vehicle roller bearing axleboxes;

- ISO 492 - Rolling bearing - Radial bearing - Tolerances;
- ISO 582 - Rolling bearing - Chamfer dimensions - Maximum values;
- ISO 5753 - Rolling bearing - Radial internal clearance;

14. Certificates

The main target of our company is to meet our customers requirements, offering high quality products at competitive prices.

We have a set of advanced scientific management system, advanced bearing production equipment, ISO 9001 and ISO 14001 certification with TUV Thuringen Germany.



S.C. " RULMENTI" S.A. GROUP

The company was set-up on May 1953 and it has a long tradition in manufacturing of bearings over 50 years, being one the important bearing producers in the Central and South-East Europe.

We manufactured and trade under URB, KRS brands or on customer request, a wide range of bearings utilized in automobiles, steel mills, electric motors, speed reducers, mining industry, construction machinery.



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