



भारत सरकार — रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ — 226011

Tele/Fax : 2465754 & 42226 (Rly)
e-mail : dse4cs@gmail.com

Government of India - Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011



EL/3.2.108

Date: 05.10.2015

Chef Electrical Engineer

- 1- Central Railway, Mumbai CST - 400001
- 2- Northern Railway, Baroda House, New Delhi - 110001
- 3- Eastern Railway, Fairlie Palace, Kolkata- 700001
- 4- Southern Railway, Park , Chennai -600003
- 5- South Central Railway, Rail Nilayam, Secunderabad -500071
- 6- Western Railway, Church Gate, Mumbai - 400020
- 7- South Eastern Railway, Garden Reach, Kolkata - 700043
- 8- East Central Railway, Hazipur, Bihar - 844101
- 9- West Central Railway, Jabalpur - 482001
- 10- South East Central Railway, Bilaspur- 495004
- 11- East Coast Railway, Bhubneshwar- 751016
- 12- North Central Railway, Hasting Road, Allahabad- 211001
- 13-Chittaranjan Locomotive works, Chittaranjan-713 331

Technical Circular No: RDSO/2015/EL/TC/0132 (Rev-0) Dated- 05.10.2015

Sub: Procedure for pressing-in of wheels on axles in electric locomotives.

1. TITLE

Procedure for pressing-in of wheels on axles and defining interference to be maintained between wheel bore and axle wheel seat in electric locomotives.

2. BACKGROUND

The instructions presently in vogue for pressing-in wheels on axle in electric locomotives are as follows:

- (i) The bore of the wheel hub is to be finished to suit axle diameter and mounting pressure. Actual size of the axle wheel seat shall be the actual sizes of wheel bore plus allowances on each obtain the requisite pressing-in pressure.
- (ii) During mounting the wheel on axle, it is recommended that a mixture of 5.5 Kg of white lead with 4.5 liters of boiled linseed oil be used as lubricant. Use of raw linseed oil or lubricating oils either alone or for thinning should not be allowed.

Zonal Railways referred the issue to RDSO to indicate the extent of interference to be maintained for guidance between wheel bore and axle wheel seat during their machining.

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In this context, RDSO studied the practices being followed by Railway workshops. Besides, the instructions contained in the ISO standards on the issue were also referred.

Based on the study, RDSO has arrived at an approximate value of interference between wheel bore and axle wheel seat for different in electric locomotives.

3. OBJECT

To lay down

- The interference to be maintained during pressing-in of wheels on axles. However, criteria of stipulated pressing-in pressure during pressing-in of wheel on axles shall remain unchanged.
- The various instructions to be kept in view during the above exercise.

4. DETAILS OF STUDY / EXPERIMENTATION DONE

RDSO studied the practices being followed by Railway workshops for pressing-in wheel on axles. Besides, the instructions contained in the INTERNATIONAL STANDARD ISO 1005/7-1982 (E) standards on the issue were also referred.

Also, Zonal Railways have informed about less pressing-in pressure with use of Molykote GN Plus during pressing-in of wheel on axle. Therefore, RDSO further conducted tests with Molykote GN Plus during pressing-in of wheels. It has been observed that the pressing-in pressure obtained is generally less than the specified. Hence, it has been decided to withdraw use of Molykote GN Plus as lubricant during pressing-in of wheel on axle.

5. APPLICATION TO CLASS OF LOCOMOTIVES

All type of Electric locomotives.

6. INSTRUCTION CONTENT

Instructions to be followed during pressing-in of wheels on axles are as follows:

- (i) At the time of pressing-in, the solid wheel disc shall be at the same ambient temperature as the axle.
- (ii) The axle shall be fully machined and finished as per the relevant drawing. If any taper exists (within limit), the small diameter must be at outside end (reversed taper not allowed).
- (iii) The wheel bore and the wheel seat area of the axle must be cleaned carefully to remove rust, grit, burr, chips and grease before assembly.
- (iv) Surface finish of the wheel bore and wheel seat area of the axle shall be as indicated in the relevant drawings. A record of actual measurements of the same shall be maintained.

- (v) Interference between wheel seat and bore should be kept in the range between $0.0009d$ to $0.0015d+0.06$ mm where 'd' is nominal diameter of wheel seat in mm.

However, the stipulated pressing-in pressure as per the relevant drawing shall be the final criteria for assembling wheels on axles. This is in view of fact that besides the interference, the pressing-in pressure also depends on various other factors like the surface finish, ovality & taper (though within the stipulated limits) etc.

- (vi) Both, the wheel seat and bore must be coated by the lubricants mentioned in para 7.
- (vii) The assembly of wheel with the axle must be carried out generally with hydraulic press, taking all suitable precautions to prevent any possible deformation of the components and damage to the machined parts.
- (viii) ***The wheel press used for wheel and axle assembly shall be equipped with a correctly calibrated pressure indicating gauge and automatic recorder producing a plot of pressing-in force as a function of wheel displacement relative to the axle wheel seat throughout the pressing operation. This plot shall be large enough to permit a precise determination of pressing-in force at any position on the curve. The pressing-in speed should be slow enough (typical value 0.5 to mm/sec) to satisfy the following conditions:***
- The pressure shall begin to rise before movement of wheel on the seat reaches 20 mm.
 - The pressing-in pressure shall gradually and smoothly increase with the displacement of the wheel, until a maximum value is reached which shall not exceed the maximum specified value as per the relevant drawing.
 - This maximum recorded value shall not fall during the pressing-in operation by more than 5 ton and any such fall shall not result in a value less than the maximum specified in relevant drawing, nor occur prior to the final 25 mm of displacement.
 - The final pressing -in pressure shall lie between the stipulated pressing-in pressure as per the relevant drawing.
- (ix) The preferred plots vis-à-vis the deviations are annexed for reference.
- (x) In case of wheel having been tested for out of balance and the extent & position of their residual out of balance being known, fitting of the wheels on the axle shall be so arranged that the residual out of balance of each of the two wheels of the same set lies in the same diametrical plane and on the same side of the Centre line of the axle. The residual out of balance of the brake disc must lie in the same diametrical plane as the out-of balance of the wheel and be opposite in relation to the Centre line of the axle.



7. MATERIAL REQUIRED AND SOURCES OF SUPPLY

MATERIAL REQUIRED (Lubricant)	SOURCES OF SUPPLY	REMARKS
A mixture of 5.5 Kg of white lead with 4.5 liters of boiled linseed oil be used as lubricant. Use of raw linseed oil or lubricating oils either alone or for thinning should not be allowed.	PUs and Zonal Railway approved source.	The stipulated pressing-in pressure as per the relevant drawing shall be the final criteria for assembling wheel on axles.
NALCO-3295	NALCO India Limited, 20A Park street, Kolkata-700 016	
ARCA mounting paste	FAG Bearing India Ltd. B -1504, Statesman House, Connaught place New Delhi-110 001	
All the above products should be used as per the guidelines given by the manufacturer for their product. The purchasers must also obtain the material safety data sheet along with the product.		

8. ADDITIONAL INFORMATION (SPECIAL BENEFITS, FINANCIAL IMPLICATION etc.)

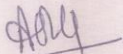
- Smooth assembly of wheels on axles.
- Prevention of scoring of axle seat during wheel dismounting from axle.

9. AGENCY AND SCHEDULE OF IMPLEMENTATION

To be implemented during wheel & axle assembly by locomotive maintenance workshops & production units.

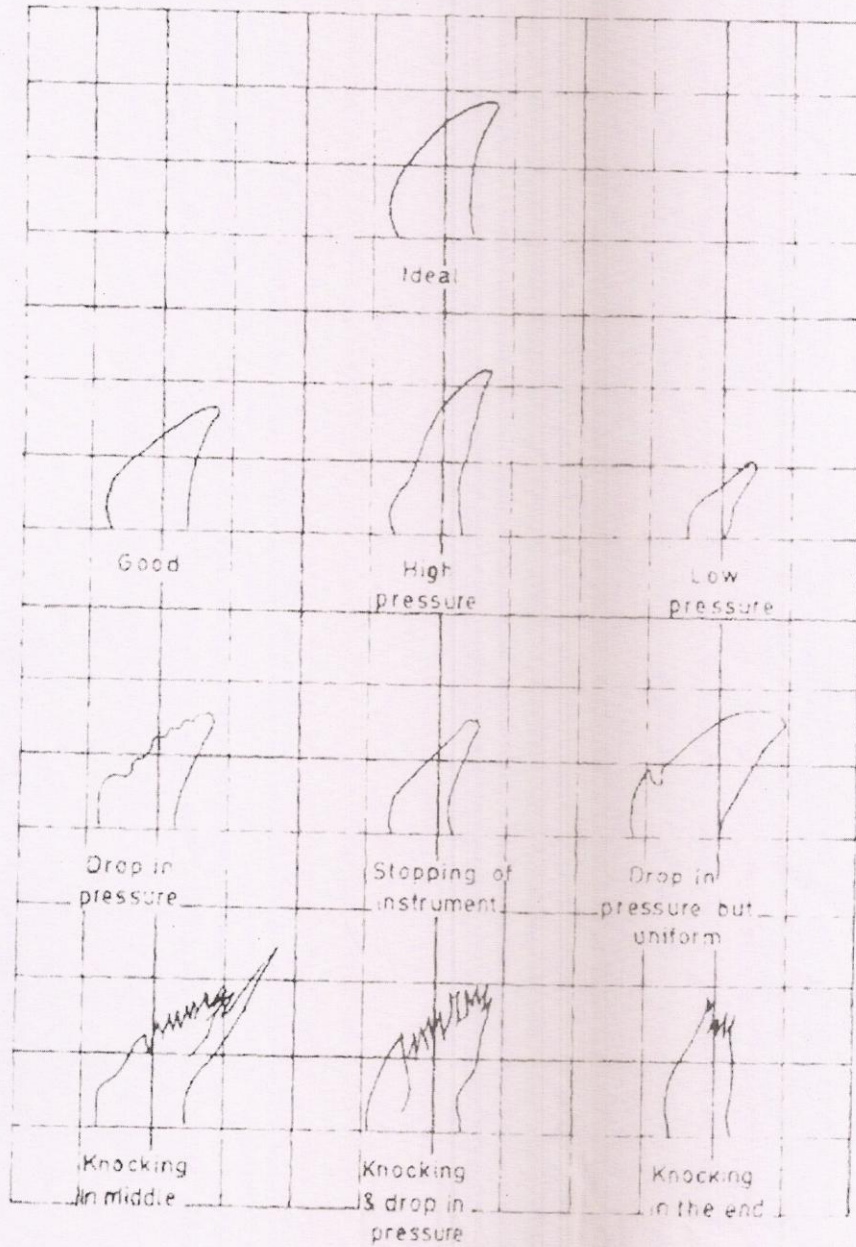
10. REFERENCE (IF ANY)

Motive Power RDSO, Instruction Bulletin No. MP.IB.VL-01.02.09 (Rev.01)


(A. K. Rastogi)
for Director General/Elect.

Wheel Mounting Pressure Curves

Annexure I



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