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भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011

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

No. EL/3.2.15

FAX No. 01746-226468

Dated 23.01.2006

Chief Electrical Engineer,

- Central Railway, Mumbai CST- 400 001.
- Eastern Railway, Fairlie Place, Kolkata- 700 001
- East Cost Railway, Chandrashekharpur, Bhubaneswar- 751 016.
- Northern Railway, Baroda House, New Delhi-110 001
- North Central Railway, Hasting Road, Allahabad-211 001.
- Southern Railway, Park Town, Chennai-600 003
- South Central Railway, Rail Nilayam, Secunderabad -500 071
- South Eastern Railway, Garden Reach, Kolkata -700 043
- South Western Railway, Hubli.
- Western Railway, Churchgate, Mumbai-400 020
- West Central Railway, Jabalpur-482001
- South East Central Railway, Bilaspur-495004
- East Central Railway, Hazipur-844101 (Bihar)
- Chittaranjan Locomotive Works, Chittaranjan- 713 331

M/s. Pamesar.

MODIFICATION SHEET NO. ELRS/MS/0343, REV. '0'

1.0 Title :

Rehabilitation of Ingersoll-Rand model 71 T2RL (1000 LPM) and model 15 TRL (2000 LPM) Compressors to improve the reliability of Electric Locos.

2.0 Object :

To avoid the problems of Choking & Bursting of Inter Cooler and After Cooler Pipe, overheating of delivery pipe line, breakage of coupling springs & looseness of Coupling of M/s. Ingersoll-Rand Model 71 T2RL (1000 LPM) & Model 15 TRL (2000 LPM) compressors for Electric Locomotives.

3.0 Existing Arrangement :

M/s. Ingersoll-Rand had supplied Model 71T2RL (1000 LPM) and model 15 TRL (2000 LPM) Compressors to Indian Railway since 1996 for Electric Locomotives. The Inter Cooler & After Cooler of 'U' shaped finned tube type in constructions is provided over the coupling thereby obstructing the accessibility of the coupling for maintenance.

Railways have reported poor performance of the compressors owing to the following reasons:-

1. Choking of Inter Cooler and After Cooler Pipe.
2. Bursting of Inter Cooler and After Cooler Pipe.
3. Overheating of delivery pipe line.
4. Breakage of coupling springs.
5. Looseness of Coupling.

The Railways have also reported about poor response of the firm i.e M/s. Ingersoll-Rand in attending to the failures.

RDSO have taken up the issues relating to poor performance of these compressors with M/s. Ingersoll-Rand on various occasions. However, required actions have so far not been taken by the firm to improve the performance of the compressors to arrest failure due to above mentioned problems.

Necessity was being felt to evolve measures to tackle above mentioned problems so as to improve the reliability of the 71 T2RL and 15 TRL model compressor which are lying in the Shed floor of various Electric Loco Sheds.

4.0 Modified Arrangement :

ELS/CNB got as per the requirements, a prototype sample for after cooler and inter cooler for both type of compressors (one no. each) as per modified piping arrangement as per Drawing No. SKEL-4702, Alt. '0' for 71 T2RL compressor & SKEL-4703, Alt. '0' for 15 TRL compressors.

The modified Inter Cooler & After Cooler with modified piping arrangement have been assembled in 71 T2RL and 15 TRL model compressors and the important parameters given below have been checked and found to be within limit :-

- Pressure building time.
- Temperature measured of out let air.
- Clearance for maintenance of the coupling.

One No. 71 T2RL model modified compressor has been fitted on Locomotive No. WAG-7, 27513 in the month of May – 2004 and one no. 15 TRL (2000 LPM) model compressor fitted on WAG-7 Locomotive No. 27615 in the month of June – 2004 of Electric Loco Shed/Kanpur.

Electric Loco Shed/Kanpur has reported satisfactory performance of compressors with modified arrangement.

Procedure for Changing of After Cooler & Inter Cooler:

1. Procure the Inter Cooler, After Cooler and connecting pipe lines and fittings as per RDSO's Drg. No. SKEL-4702, Alt. '0' for 71 T2RL model and SKEL-4703, Alt. '0' for 15 TRL model compressors.
2. Remove the existing Inter Cooler and After Cooler along with its piping and fitting arrangement.
3. Assemble the modified Inter Cooler and After Cooler as shown in RDSO's Drg. No. SKEL-4702, Alt. '0' for 71 T2RL (1000 LPM) Compressor and Drg. No. SKEL-4703, Alt. '0' for 15 TRL (2000 LPM) Compressor.
4. After assembly manually rotate the compressor to ensure any infringement with moving parts.
5. After assembly check for accessibility of the coupler for ease of maintenance.
6. Run the compressor and note the pressure building time it should not be more than 11 minutes for 1000 LPM compressors to build up pressure from 0 to 10 kg/cm² and should not be more than 5 minutes for 2000 LPM compressors to build up pressure from 0 to 10 kg/cm².
7. Measure the temperature at the discharge of the compressor shall not be more than 30⁰C above ambient when working at a pressure of 10.0 kg/cm².

Railways should arrange to carry out the above modification through M/s. Ingersoll-Rand (i.e. OEM of these compressors) or M/s. Panesar Engineering Co. who have carried out the modification on two compressors at ELS/CNB. The credentials of such sources (other than M/s. Ingersoll-Rand and M/s. Panesar) who may be approach Railway for doing this modification may be furnished to RDSO for review and approval before procuring the items for getting the compressors modified from such sources

5.0 Application to Class of Locomotives :

All class of Electric Locomotives having 71 T2RL (1000 LPM) and 15 TRL (2000 LPM) compressors which are lying in Shop Floor for want of attention due to reason(s) mentioned in para (3) above and are not within warranty.

6.0 Material Required :

- i) Inter Cooler & After Cooler for 71 T2RL (1000 LPM)
Compressor as per RDSO's Drg. No. SKEL-4702, Alt. '0'.
- ii) Inter Cooler & After Cooler for 15 TRL (2000 LPM)
Compressor as per RDSO's Drg. No. SKEL-4703, Alt. '0'.

7.0 Material Rendered Surplus :

i) Inter Cooler Assembly complete

Part No. - 32025439 N1 for 71 T2RL

Part No. - 32025801 N for 15 TRL

ii) After Cooler Assembly complete

Part No. - 70236617 for 71 T2RL

Part No. - 70243076 for 15 TRL

8.0 References :

Recommendation of XXX MSG (Elec. Loco) meeting vide Item No. II of Part - I (Railways Feedback Items) of Minutes of XXX MSG Meeting held at Mumbai, Western Railway on 17th & 18th January 2005 .

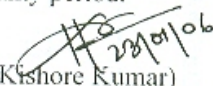
9.0 Modification Drawing :

- i) Drawing No. SKEL-4702, Alt. '0' for 71 T2RL Compressor
- ii) Drawing No. SKEL-4703, Alt. '0' for 15 TRL Compressor.

10.0 Agency of Implementation :

All Electric Loco Sheds and POH Shops having defective 71 T2RL and 15 TRL Compressors which have completed warranty period.


Encl: As above

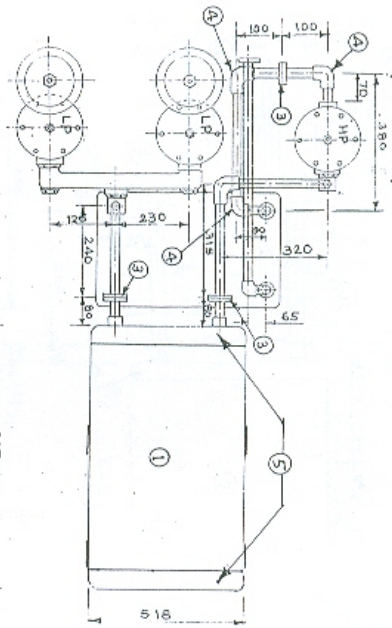

(Kishore Kumar)
for Director General/Elect.

Copy to: As per Standard Mailing List No. EL/M/0019

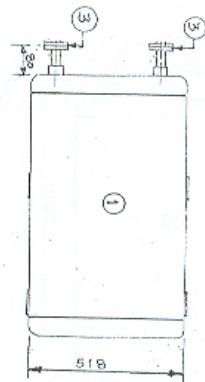
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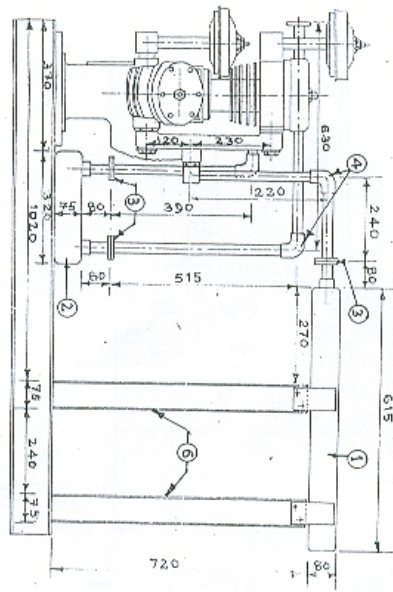
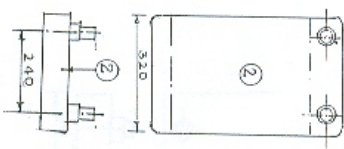

(Kishore Kumar)
for Director General/Elect.



INTER COOLER



AFTER COOLER



- NOTE:
1. INTER COOLER COPPER PIPE FINNED TUBES
OD 16 mm, ID 14 mm, LENGTH 625 mm (28 nos.)
 2. AFTER COOLER COPPER PIPE FINNED TUBES
OD 16 mm, ID 14 mm, LENGTH 410 mm. (16 nos.)

STATUS	ALT	REF. NO.	DESCRIPTION	APPROVED BY	DATE
-	-	-	-	-	-

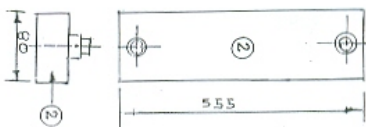
RDSO. ELECT. DIV. SKEL. 4703, ALT. '01' SUPERSEDED BY

REF. NO.	PART NO.	DESCRIPTION	DETAIL DRG. NO.	NO. LOC.	MATL.	SPEC.
1.	-	SEAMLESS CARBON STEEL PIPE.	-	-	-	IS: 2062
2.	-	INTER COOLER SUPPORT	-	-	-	IS: 2062
3.	-	MANIFOLD INTER COOLER	-	-	-	IS: 2062
4.	-	ELBOW 1"	-	-	-	IS: 2062
5.	-	FLANGE	-	-	-	IS: 2062
6.	-	AFTER COOLER	-	-	-	IS: 2062
7.	-	INTER COOLER	-	-	-	IS: 2062

GENERAL ARRANGEMENT OF 15TRL COMPRESSOR WITH FLAT TYPE INTER AND AFTER COOLER

FOR ISSUED - 30th, 2006

SUPERSEDES -



REF. NO	PART NO	DESCRIPTION	DETAIL DRG. NO	NO. LOC	MATL.	SPEC.
7	-	SEAMLESS CARBON STEEL PIPE	-	-	SEAMLESS	ASTM A 106
6.	-	INTER COOLER SUPPORT	-	03	M S	IS: 2062 1902
5	-	MANIFOLD INTER COOLER	-	01	M S	IS: 2062 1999
4.	-	ELBOW 1"	-	08	M S	IS: 2062 1999
3	-	FLANGE 1"	-	13	M S	IS: 2062 1999
2.	-	AFTER COOLER	-	01	CU FIN S	IS: 3331 1977
1.	-	INTER COOLER	-	01	CU PIPE	BS: 2674 1972

NOTE:

1. INTER COOLER COPPER FINNED TUBES
OD 32 mm, ID 29 mm, LENGTH 410 mm (8 nos.).
2. AFTER COOLER COPPER PIPE FINNED TUBES
OD 19 mm, ID 16 mm, LENGTH 440 mm. (4 nos.)

GENERAL ARRANGEMENT OF 71TRRL COMPRESSOR WITH FLAT TYPE INTER AND AFTER COOLER

BY  (FOR DE)

SUPERSEDES -

SUPERSEDED BY-

STATUS	ALT REF. NO.	DESCRIPTION	APPD. BY	DATE
-	-	-	-	-

RDSO. ELECT. DTE SKEL-4702, ALT. '0'

SUPERSEDED BY-