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भारत सरकार - रेल मंत्रालय  
अनुसंधान अधिकल्प और मानक संगठन  
लखनऊ - 226 011  
Government of India - Ministry of Railways  
Research Designs & Standards Organisation  
Lucknow - 226 011

MC/LHB/Coach

Date- 08-10-2010

The General Manager (Engg.)  
West Central Railway, Jabalpur - 482 001

**Sub: Speed Certificate for operation of Express trains comprising ~~of~~ maximum 18 numbers of LHB AC EOG variant coaches hauled by single WAP5 Locomotive on Nagda – Mathura Jn. section of West Central Railway at a maximum speed of 140 kmph on track maintained to C&M-I (Vol.-I) standard.**

1. Railway Board vide their letter no. 2006/CE-II/TK/4 Part dated 09.4.2008 has proposed to run the Express train with LHB AC EOG rake hauled by WAP5 Locos with speed potential up to 140 kmph between New Delhi- Mumbai and New Delhi-Allahabad-Howrah routes.
  - 1.1. RCF has built LHB AC EOG variant broad gauge coaches fitted with FIAT bogies under Transfer of Technology from M/s. ALSTOM-LHB. The AC coaches, generally to RDSO's drawing No. Sk. 96077 and to RCF's drawing No. LE 90009 have a speed potential for operation at a maximum speed of 160 km/h, on track maintained to standards contained in RDSO's Report No. C&M-I Vol.-I. These coaches have been built to the-state-of-art technology, fitted with disc brakes and centre buffer couplers and have a unique feature of wheel slide protection device (WSP), to prevent formation of wheel flats.
  - 1.2. LHB AC EOG Chair car has undergone detailed oscillation trials up to test speed of 115 kmph on Anupganj- Chandrauli section of Northern Railway on track maintained to other than C&M-I, Vol.-I standard. The test results of trials as contained in RDSO Report no. MT-233 (June 2000), exhibit satisfactory riding and stability behavior, upto test speed of 115 kmph on track maintained to other than C&M-I, Vol.-I standard. Similarly, the LHB AC Generator Van and LHB AC 3-Tier EOG variant coach have undergone detailed oscillation trials up to test speed of 115 kmph on Lucknow-Sultanpur section of Northern Railway on track maintained to other than C&M-I, Vol.-I standard. The test results of trials as contained in RDSO Report nos. MT-279 and MT-406 respectively, exhibit satisfactory riding and stability behavior, upto test speed of 115 kmph on track maintained to other than C&M-I, Vol.-I standard. On the basis of satisfactory oscillation trial result, the speed certificates for regular operation of LHB AC chair cars, LHB AC Generator Van and LHB AC 3-Tier EOG variant coach at a maximum speed of 105 km/h on track maintained to other than C&M-I Vol.-I standard have been issued vide RDSO's letters nos. MC/LHB/Coach dated 14.3.2001, MC/LHB/Coach dated 04.4.2001 and MC/LHB/Coach dated 02.5.2003 respectively.
  - 1.3. LHB AC EOG Chair car has undergone detailed oscillation trials up to test speed of 180 kmph on Palwal-Mathura section of Northern Railway & North-Central Railway on track maintained to C&M-I, Vol.-I standard. The test results of trials as contained in RDSO Report no. MT-240, exhibit satisfactory riding and stability behavior, upto test speed of 180 kmph on track maintained to C&M-I, Vol.-I standard. The LHB AC Generator Van has undergone detailed oscillation trials up to test speed of 145 kmph on Palwal-Mathura section of Northern Railway & North-Central Railway and from 145 kmph upto 180 kmph on Ghaziabad-Tundla section of North-Central Railway on track maintained to C&M-I, Vol.-I standard. The test results of trials as contained in RDSO Report no. MT-274 and MT-282 respectively. The test results of these trials

exhibit satisfactory riding and stability behavior, upto test speed of 180 kmph on track maintained to C&M-I, Vol.-I standard. Similarly, LHB AC 3-Tier EOG variant coach has undergone detailed oscillation trials up to test speed of 180 kmph on Ghaziabad-Tundla section of North-Central Railway on track maintained to C&M-I, Vol. I standard. The test results of trials as contained in RDSO Report nos. MT-412, exhibit satisfactory riding and stability behavior, upto test speed of 180 kmph on track maintained to C&M-I, Vol.-I standard. On the basis of satisfactory riding and stability behavior, the speed certificates for regular operation of LHB AC chair cars, LHB AC Generator Van and LHB AC 3-Tier EOG variant coach at a maximum speed of 160 km/h on track maintained to C&M-I Vol.-I standard have been issued vide RDSO's letters nos. MC/LHB/Coach dated 19.3.2003, MC/LHB/Coach dated 20.3.2003 and MC/LHB/Coach dated 20.5.2003 respectively.

- 1.4. Coupler force and EBD trials of 18 numbers of LHB AC EOG coaches with single WAP5 Locomotive have been conducted on NDLS-CNB-NDLS section of Northern Railway and North Central Railway and the test results as contained in Report no. MT-283 (March 2001) are found within limit.
- 1.5. The Confirmatory Oscillograph Car Runs of LHB AC EOG coaches hauled by single WAP5 Locomotive have been conducted on Nagda- Mathura high speed route of West Central railway, in both up and down directions upto a max speed of 140 kmph. The test results as contained in RDSO's Report no. RDSO/2010/TG/MT-1057/F Rev.0 Amendment-Nil, dated 20.8.2010 exhibit satisfactory riding and stability behavior upto maximum speed of 140 kmph.
- 1.6 The WAP5 class of locomotives, with Bo-Bo bogies are imported from M/s. ABB, Switzerland and now are being manufactured by CLW. Outline of the locomotive is as per drawing no. SK.EL.4353. Detailed oscillation trials of WAP5 have been done at a maximum test speed of 180 km/h and results as contained in RDSO's Report No. MT-88 (June 1997) indicate satisfactory riding and stability behavior. Based on the test results of the trials of WAP5 class of locomotive has been cleared for operation at a maximum speed of 160 km/h on track maintained to standards laid down in Report No. C&M-I Vol.-I vide RDSO's letter No. SD.WAP5.11 dated 19.6.1997.
2. Based on the above, it is certified that Express trains hauled by single WAP5 class of locomotive having maximum 18 numbers of LHB AC EOG variant coaches including two AC Generator Van may be permitted to operate up to the maximum speed of 140 kmph between Nagda-Mathura Junction section of West Central Railway on track maintained to C&M-I, Vol.-I standard, subject to the following conditions.
  - 2.1. **Track**
    - 2.1.1. The track shall be to a minimum standard of 52 kg rails on sleepers to M+7 density and minimum depth of ballast cushion below the sleepers to 250 mm which may consist of at least 100 mm clean and the rest in caked up condition on compacted and stable formation.
    - 2.1.2. The track maintenance shall be in accordance with the recommendations contained in RDSO Report No. C&M-I Vol.-I. In this connection, the instructions for the maintenance of track on high-speed routes circulated to the railways under RDSO's DO letter no. CRA/509 dated 07.7.1971 and approved by Railway Board vide their letters no. 71/W6/HS/8 dated 27.8.1971 and 71/W6/HS/1 dated 21.10.1971 should also be followed.

- 2.1.3. For track maintained to lower standard than that mentioned above, the Chief Engineer shall decide the lower maximum permissible speed on the basis of maintenance condition. In this connection, Railway Board's letter no. 65/WDO/SR/26 dated 19/20.10.1996 may be seen. When the Chief Engineer considers that the road bed is not compacted or there is improper drainage, he may suitably restrict the maximum permission speed depending upon the local conditions.
- 2.1.4. The maximum permissible speed on curves to be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual Second Reprint-2004.
- 2.1.5. Wherever condition warrant on account of corrosion on rail/weld collar, wear of rail, cupping in the welds etc. necessary precautions should be taken for fish plating/joggle fish plating of the rail/weld.
- 2.1.6. (i) Replacement of existing loose heel switches with fixed heel curved switches laid on PSC sleeper layout with CMS crossings with adequate arrangements to ensure designed geometry of turnouts. Turnouts with TWS shall be preferred on such routes.
- (ii) Preferably Improved SEJ should be provided on such routes.

## 2.2. Bridges

- 2.2.1. The clearance refers to bridges with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for BGML, RBG and MBG-1987 standard loadings. However, the bearings of span 78.8 m (effective) designed for BGML standard loading as per RDSO's drawing no. BA-11154 should be strengthened by providing two additional anchor bolts.
- 2.2.2. Superstructures and bearings of non-standard spans including Arches and sub-structures of all bridges are to be examined under the directions of the Chief Bridge Engineer concern and certified safe by him in terms of current IRS Bridge Rules, Steel Bridge Code, Concrete Bridge Code, Arch Bridge Code, Bridge Sub Structures and Foundations code etc. read with upto-date correction slips.
- 2.2.3. Zonal Railways to certify adequacy of existing bridges for permitted rolling based on physical condition of bridges by keeping them under observations considered necessary by the Chief Bridge Engineer of Railway.
- 2.2.4. Location of bridges on which speed restrictions are imposed shall be notified by the Railways and incorporated in the working timetable.
- 2.2.5. This clearance is subject to the following parameters of locomotives and LHB AC EOG variant coaches:

### (A) For Locomotive

S. No.	Description	WAP5
1.	Max. axle load	19.5 ± 2% t
2.	Max. tractive effort	26.3 t
3.	Max. braking force at rail level	16.3 t
4.	Max. CG height above rail level	Not exceed 1830 mm

(B) For LHB AC EOG Variant Coaches

i) AC First Class (EOG) Variant Coach

Maximum Gross Load : 43.5 t  
Maximum Braking Force : 4.65 t  
(at 3 kg/cm<sup>2</sup> BC pressure)  
CG height above rail level : Not exceeding 1830 mm

ii) AC Sleeper Class (EOG) Variant Coach

Maximum Gross Load : 46.72 t  
Maximum Braking Force : 4.65 t  
(at 3 kg/cm<sup>2</sup> BC pressure)  
CG height above rail level : Not exceeding 1830 mm

iii) AC 3-tier Sleeper (EOG) variant coach

Maximum Gross Load : 48.8 t  
Maximum Braking Force : 4.65 t  
(at 3 kg/cm<sup>2</sup> BC pressure)  
CG height above rail level : Not exceeding 1830 mm

iv) AC Pantry Car

Maximum Gross Load : 48.2 t  
Maximum Braking Force : 4.65 t  
(at 3 kg/cm<sup>2</sup> BC pressure)  
CG height above rail level : Not exceeding 1830 mm

v) Generator van

Maximum Gross Load : 56.8 t  
Maximum Braking Force : 5.32 t  
(at 3 kg/cm<sup>2</sup> BC pressure)  
CG height above rail level : Not exceeding 1830 mm

2.2.6. Specific restrictions are applicable as mentioned in relevant speed certificates of hauling single/multiple locomotives issued by RDSO.

### 2.3. Signaling

2.3.1. Provision of GR, SR, SEM and all extant instructions issued from time to time shall be complied with.

2.3.2. On the sections where EBD of more than 1 Km is to be catered for ,second distant signal or automatic signaling should be available failing which suitable speed restriction is to be imposed.

### 2.4. Traction Installation

2.4.1 The OHE shall have swivelling type of cantilever having the tension in the conductors regulated automatically, with a presag of 50 / 100 mm. The presag is on contact wire for a maximum span of 72 meter, proportionately less for smaller spans.

- 2.4.2 In case of locations where porcelain section insulators are installed on main line and lie within first 1/10<sup>th</sup> and 1/3<sup>rd</sup> of the span immediately after the OHE structure and the runners in the trailing direction the maximum speed shall be limited to 120 km/h. At all other locations where porcelain section insulators are installed, the speed shall be limited to 80 km/h.
- 2.4.3 The current collection shall be made through one number pantograph fit for high-speed operation.
- 2.4.4 It will be ensured that the cantilevers in the trial section have BFB steady arm (RI No. 2390) with 25 mm drop bracket assembly (RI No. 2360).
- 2.4.5 In 25kV a.c. traction area, the CEE of Railway shall have to ensure that the minimum height of contact wire as stipulated in provision of Chapter –V and V-A, Electric Traction "Schedule of Dimension of 1676 mm gauge (BG) revised 2004" is not violated and strictly followed to ensure its safe running.
- 2.4.6 In addition to the above, the Chief Electrical Engineer may impose any temporary speed restriction is based on the conditions prevailing on any particular section.

## **2.5 Rolling Stock**

- 2.5.1 Before starting the operation, CME/CEE of the concerned Railway will certify the track worthiness and safety of the rolling stocks. He will also ensure proper maintenance of the stocks.
- 2.5.2 The Wheel Slide Protection (WSP) device of all the coaches in the rake shall be functional at the starting station. If the WSP of any coach becomes defective enroute, the brake system of that particular coach shall be isolated.
- 2.5.3 The earthing arrangement on the coaches shall be maintained as per design.
- 2.5.4 The LHB AC EOG coaches shall be maintained as per "Preventive Maintenance system for LHB Coaching Stock" issued by Railway Board and the instructions issued by RDSO & Railway Board time to time.
- 2.5.5 Two Generating vans one at each end shall be provided in 18 coach formation.

## **2.6 General**

- 2.6.1 All the permanent and temporary speed restrictions in force and those that may be imposed from time to time due to track, bridges, curves, signaling and interlocking etc shall be observed.
- 2.6.2 Attention is also invited to the note on "Preparation of Electrical Equipment of Diesel and Electric Locomotives for high speed operation" circulated with this office letter No. EL/3.3.15/WAM2/Gr.CON dated 24.12.1970 and the locomotive should be attended accordingly.
- 2.6.3 LHB AC EOG variant coaches (other than ACCN) with 23540 mm length over body and 12340 mm maximum distance apart between any two adjacent axles infringes clauses 13 (b) 16, 17, 19(b), 20(b), 21(b), 22 & 32(b) of Chapter IV (A) of BG Schedule of

Dimensions, 1973 Reprint. These infringements of LHB AC EOG variant coaches were condoned by Railway Board vide their letter No. 97/CEDO/SR/3 dated 07.02.1997.

- 2.6.4 LHB AC-3 Tier (ACCN) variant coach with 23540 mm length over body and 12340 mm maximum distance apart between any two adjacent axles infringes clause 13(b), 16, 17, 19(b), 20(b), 21(b), 22, 31 and 32(b) of Chapter IV (A) of BG Schedule of Dimensions, 1973 Reprint. These infringements of LHB ACCN EOG variant coach were condoned by Railway Board vide their letter No. 2002/CEDO/SR/13 dated 10.12.2002.
- 2.6.5 The pantograph of WAP5 Locomotive in locked down condition and the surge arrestors infringe the Maximum Moving Dimensions of 1929 over non-electrified sections. After removing the pantograph pan assembly and two surge arrestors, the profile will infringe the Maximum Moving Dimensions of 1929 but will be within 'X' class loco profile. For movement of loco in non-electrified sections, pantograph pan assembly and two surge arrestors shall be removed and the movement of the loco shall be cleared by the Railway concerned as per the extant rules applicable. In non electrified section where Maximum Moving Dimensions of existing 'X' class loco are not permissible, the movement shall be in accordance with the instructions issued by Railway Board and other additional instructions issued by the Zonal Railways for the movement of ODCs. Railway Board have condoned these infringements vide their letter no. 95/CEDO/SR/18 dated 14-7-1995.
- 2.6.6 The adequacy of the brake power available on the locomotives in conjunction with the coaching stock to be used in the proposed train, vis-a-vis the signalling system available on the route, will have to be established.
- 2.6.7 Concerned Railways will provide fencing as per their assessment to prevent unauthorized pedestrian/cattle crossings.

- DA: 1. Rly. Bd.'s letter No.97/CEDO/SR/3 dated 07.02.1997  
2. RDSO Sk.96077  
3. Rly. Bd.'s letter no.2002/CEDO/SR/13 dated 10.12.2002  
4. RCF's drawing no. LE 90009



**(Rajiv Vishnoi)**

**Sr. Executive Director Standards (Motive Power)**

Copy to:

- i) The Secretary (Mech., Elec. & Engg. /G)  
Railway Board, Rail Bhawan, New Delhi - 110 001
- ii) The General Manager (Mech., Elect. , Optg. & S&T)  
West Central Railway, Jabalpur-482001

DA:

1. Rly. Bd.'s letter No.97/CEDO/SR/3 dated 07.02.1997  
2. RDSO SK.96077  
3. Rly. Bd.'s letter no.2002/CEDO/SR/13 dated 10.12.2002  
4. RCF's drawing no. LE 90009.



**(Rajiv Vishnoi)**

**Sr. Executive Director Standards (Motive Power)**

GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS  
(RAILWAY BOARD)

No. 97/CEDO/SR/3.

1/29/97

सं. ९७/सी. ई. डी. /एस. ए. ३

नयाँ दिल्ली - ७.०२.९७

07.02.97

To,

The Director General (Track),  
R.D.S.C.,  
Manak Nagar,  
LUCKNOW - 226 001.

Sl. No. 127

Sub: LHB Coach - Condonation of the infringements  
to Schedule of dimensions 1973.

With reference to your application No. CT/LC/BG, dt.  
17/20.1.97, sent through the Chief Commissioner of Railway  
Safety, Lucknow, the sanction of Ministry of Railways is  
hereby communicated for condonation of infringement to item  
13(b), 16, 17, 19(b), 20(b), 21(b), 22 & 32(b) of Chapter-IV(A)  
of B.G. Schedule of dimensions (1973) involved in 23540 mm  
long LHB coach with 2350 mm width.

The sanction is based on Form-XI and Sketch No.96077  
accompanying your application referred to above.

( V.K. BAHANI )  
Exec. Dir. Civil Enng. (G)  
Railway Board.

No. 97/CEDO/SR/3.

New Delhi, Dt. 07.02.97.

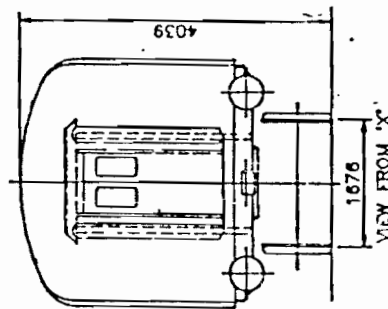
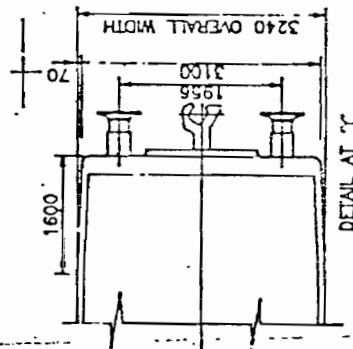
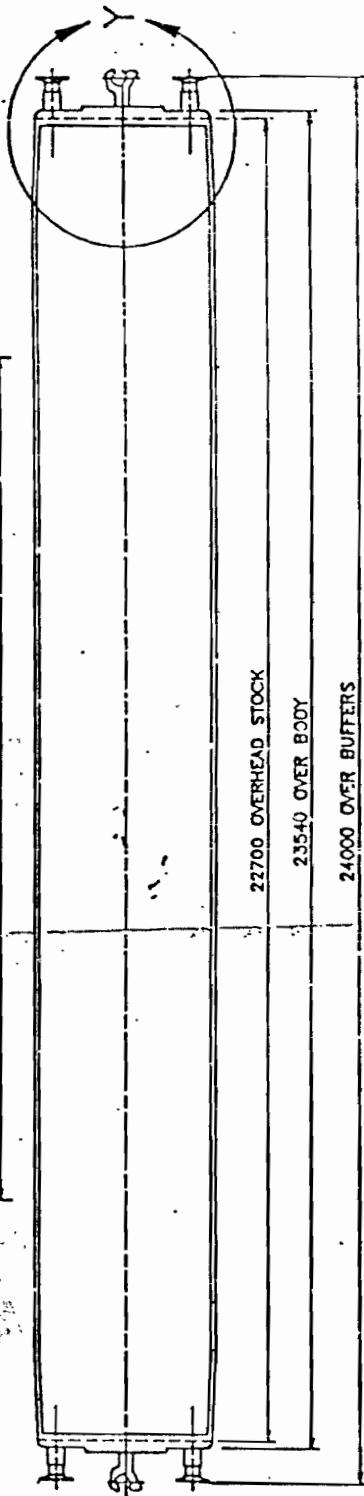
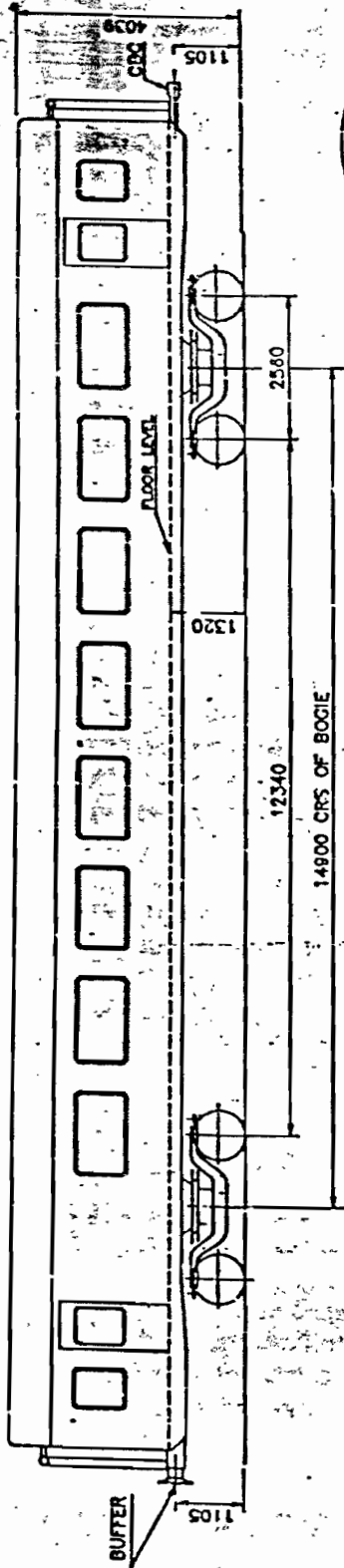
Copy forwarded for information to the Chief  
Commissioner of Railway Safety, 16-A, Ashok Marg, Lucknow  
- 226 001 with reference to his endorsement No. Q.17012/1/97/RS  
dated Nil.

( V.K. BAHANI )  
for Secretary Railway Board.

DST-13-T  
DST-13

Copy to file





NOTE:-

BUFFERS ARE TO BE PROVIDED ONLY  
IN POWER CAR.

DIAGRAM SHOWING MAIN DIMENSIONS  
OF LHB-IR COACH.

SKETCH-96077





भारत सरकार GOVERNMENT OF INDIA  
रेल मंत्रालय MINISTRY OF RAILWAYS  
(रेलवे बोर्ड RAILWAY BOARD)

*Handwritten notes:*  
11/12  
10/12  
11/12

संख्या नं०  
No. 2002/CEDU/SR/13

रेल भवन, नई दिल्ली-110001, दिनांक  
Rail Bhavan, New Delhi-110 001, Dated 10-12-2002

The Director General/Track,  
R.D.S.O.,  
MANAK NAGAR,  
LUCKNOW - 226011.

Sub:- LHB variant AC3 - Tier EOG coach- Condonation of the infringements to Schedule of Dimensions-1929.

With reference to your application No. CT/DHS/3/Coach dt. 25-7-02, sent through the Chief Commissioner of Railway, Safety, Lucknow, the sanction of Ministry of Railways is hereby communicated for condonation of infringement to the profile of standard maximum moving dimensions 1929 and others to clause 13(b), 16, 17, 19(b), 20(b), 21(b), 22, 31 & 32(b), Chapter-IV(A) of Schedule of Dimensions, 1973 (Reprint) involved in the design of LHB Variant AC3-Tier EOG Coach as shown in Form-XI and sketch Plans accompanying your application referred above.

As the said coach has to move under restricted speed conditions.. The Zonal Railways therefore to take the sanction of the Competent Authority both for movement of these coaches and for the condonation of infringement on the respective section as usual.

*Signature*  
(Parinod Kumar)  
Exec. Dir. Civil Engg. (C)  
Railway Board

No. 2002/CEDU/SR/13

New Delhi, dated 10-12-2002

Copy forwarded for information to the Chief Commissioner of Railway Safety, Lucknow-226001, w.r.t. his endorsement No. -17012/01/2002-104 dated 24-10-2002.

*Handwritten signatures:*  
Essc  
MCL  
D/S

(Parinod Kumar)  
for Secretary, Railway Board

*Handwritten note:*  
Please see your file.

