भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
EPBX (0522) 2451200
Fax (0522) 2458500

Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
DID (0522) 2450115
DID (0522) 2465310

FINAL SPEED CERTIFICATE FOR OPERATION

No.	As per header	Date	07.08.2020

A. महाप्रबन्धक (इंजीनियरिंग),

1. मध्य रेलवे, छत्रपति शिवाजी टर्मिनस, मुम्बई– 400 001
2. पूर्व रेलवे, फेयरली प्लेस, कोलकाता– 700 001
3. उत्तर रेलवे, बडौदा हाऊस, नईदिल्ली– 110 001
4. पूर्वोत्तर रेलवे, गोरखपुर– 273 001
5. पूर्वोत्तर फ्रन्टियर रेलवे, मालीगॉव, गुवाहाटी– 781 011
6. दक्षिण रेलवे, एनेक्सी, पार्क टाऊन, चेन्नई– 600 003
7. दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद– 500 071
8. दक्षिण पूर्व रेलवे, गार्डनरीच, कोलकाता– 700 043
9. पश्चिम रेलवे, चर्चगेट, मुम्बई– 400020
10. उत्तर मध्य रेलवे, प्रयागराज – 211 001
11. उत्तर पश्चिम रेलवे, जयपुर– 302 006
12. पूर्व मध्य रेलवे, हाजीपुर– 844 101
13. पूर्व तट रेलवे, रेलवे कॉम्पलेक्स, भुवनेश्वर– 751 023
14. दक्षिण पश्चिम रेलवे, हुबली– 580 023
15. पश्चिम मध्य रेलवे, जबलपुर– 482 001
16. दक्षिण पूर्व मध्य रेलवे, बिलासपुर– 495 004

B. **प्रबन्ध निदेशक,** डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इंडिया लि., 5वॉ तल, प्रगति मैदान मेट्रो स्टेशन बिल्डिंग कम्पलेक्स, नई दिल्ली–110 001.

Sub:	Final speed certificate for operation of Broad Gauge Bogie Ammonia tank wagon type BTALNM (Variant-B) with maximum axle load of 20.03t for operation over Indian Railway B.G. route.

1.0	IMPORTANT PARAMETERS RELATED TO ROLLING STOCK

Type	Final / Provisional / Oscillation Trial / COCR Movement	Final	Validity/ Period or Permanent	IR / Sectional	IR Permanent

Stock Name	POL tank wagon type 'BTALNM (Variant-B)'	Max. Axle Load (Empty)	11.99 t	Max. Axle Load (Loaded)	20.03t

Transportation Code	BTALNM	GA Drg. No.	RDSO Drg. No. WD-14002-S-52 Alt.- Nil

Bogie Arrgt. Drg	Casnub HS bogies		Suspension Arrgt. Drg	RDSO Drg. No WD-04038-S/02

Commodity	Coal / Ore / Steel / Bagged / Oil /etc.	Liquid Ammonia	Gauge	BG

Type of Bogie	Casnub HS Bogie	Type of Coupler	CBC	Wheel Dia. (mm)	New	Worn
					1000	906

Rake / Train consist for COCR / Oscillation Trial	1 Loco + 33 BTALNM wagons + 1 Brake Van

Max. Permissible Speed	Empty	100 kmph	Loaded	90 kmph

2.0	INTRODUCTION

2.1.	Broad Gauge Bogie Ammonia Tank Wagon type 'BTALNM' (Variant-B) to RDSO Drawing No. WD-14002-S-52 Alt. Nil has been developed by RDSO for transportation of liquid Ammonia. The design incorporates Casnub HS bogie, twin pipe graduated release air brake system and Standard non- transition CBC at both ends. The leading particulars of the wagon have been shown in RDSO Drg. No. WD-14002-S-52 Alt. Nil and Annexure-I.
2.2.	In order to assess the riding quality and stability behaviour of 'BTALNM' wagon in empty and loaded condition, detailed oscillation trials have been conducted over Mahoba (MBA) - Khajuraho (KURJ) section of North Central Railway. The results of

	the trial are given in RDSO Report No. RDSO/2019/TG/MT-1620/F Rev.-0/Amendment –Nil dated 12.07.2019. Oscillation trial results indicate that 'BTALNM' wagon has exhibited satisfactory riding and stability behaviour up to a test speed of 110 kmph in empty and loaded condition on locations/stretches as per current revisions of "Third Report of Standing Criteria Committee" on track maintained to other than C&M-I, VoL-I Standard.

3.0	Based on the design features of BG Bogie Ammonia Tank Wagon type BTALNM (Variant-B) as detailed in Annexure-I and satisfactory test results as indicated in RDSO Report No. RDSO/2019/TG/MT-1620/F Rev.-0/Amendment –Nil dated 12.07.2019 and above, it is certified that 'BTALNM' wagon having maximum axle load of 20.03 t to RDSO Drawing No. WD-14002-S-52 Alt. Nil may be permitted to run up to maximum speed of 90 kmph in loaded condition and 100 kmph in empty condition subject to the following conditions:

3.1	**TRACK STRUCTURE DETAIL & SPEED:**

3.1.1. The track structure shall be to a minimum standard of

Track structure	Sleeper Density	Ballast Cushion	Max. Speed Empty	Max. Speed Loaded
52kg (90 UTS)	1540 Nos./km PSC sleeper	250mm below sleepers (100mm clean & rest caked up condition)	100 Kmph	90 Kmph
52kg (72 UTS)	1540 Nos./km PSC sleeper	250mm below sleepers (100mm clean & rest caked up condition)	65 Kmph	50 Kmph

3.1.2.	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, instructions issued by Railway Board letter no.65/WDO/SR/26 dated 19/20.10.1966 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 permissible speed depending upon the local conditions.
3.1.3.	The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railway Permanent Way Manual –June 2020.
3.1.4.	The welds shall be protected by joggled fish plates as per provisions of Para 6.4 and Para 8.14 of USFD Manual and Para 6.3 of AT welding manual and other policy instructions of Railway Board. The maintenance of Rails and Rail joints shall be ensured as per para 613 & 620 of IRPWM -June 2020. In addition, wherever condition warrants on account of corrosion on rail/weld collar, wear on rail, cupping of welds etc., necessary precautions shall be taken for fish plating/ joggled fish plating.

3.1.5.	Zonal Railway shall ensure further detailed examination of track as deemed fit based on the age cum condition basis, overdue renewal and condition of formation etc. as per provisions of Chapter-VII of IRPWM-June 2020 regarding permanent way renewals and may suitably restrict maximum speed of operation based on such examination.

3.2. BRIDGE STIPULATIONS:

3.2.1.	The clearance refers to bridges “Standard Spans” 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 76.2 m (clear) designed for BGML standard loading as per RDSO’s drawing No. BA-11154 should be strengthened by providing two additional anchor bolts.
3.2.2.	Superstructures & bearings of “Special Spans” (designed and constructed by Zonal Railways based on site requirements) including Arches and sub structures of all bridges (all Standard & Special Spans) are to be examined under the directions of the Chief Bridge Engineer concerned and certified safe with respect to current Indian Railway Standard Codes with up to-date correction slips.
3.2.3.	Clearance is subjected to following parameters of BTALNM wagons:

S.No.	**Parameters**	**Details**
(i)	Maximum axle load (empty)	11.99 t
(ii)	Maximum axle load (loaded)	20.03 t
(iii)	Track loading density (gross)	4.57 t/m
(iv)	Maximum breaking force	10% of axle load
(v)	C.G. height from rail level (empty)	1800 mm
(vi)	C.G. height from rail level (loaded)	2070 mm

3.2.4.	Locations of bridges on which speed restrictions are imposed shall be notified by the Zonal Railways and incorporated in the working timetable.
3.2.5.	Other restrictions are applicable as mentioned in relevant Speed Certificates of hauling single/multiple locomotives issued by RDSO.
3.2.6.	The above clause have been arrived considering bridges are in physically sound condition. In case the bridges are not in satisfactory physical condition, necessary speed restriction to be imposed by concerned Chief Bridge Engineer of the Zonal Railway.

3.3. SIGNALLING STIPULATIONS

3.3.1.	Provisions of GR, SR, IRSOD, SEM & all extant instructions issued from time to time as applicable shall be complied with.
3.3.2.	In case of Train (having this Wagon in its composition)/rolling stocks having EBD of more than 1Km and non-provision of second distant signal/4 aspect automatic signalling in the section, action as per A&C no. 09 of SEM Pt.-I shall be taken.

3.4.	**TRACTION STIPULATIONS:**

3.4.1.	The Dome cover of Bogie Tank Wagon type 'BTALNM' shall be in closed & locked down condition during movement.
3.4.2.	In 25KV AC traction area the CEE of the Railway shall have to ensure that the minimum height of Contact Wire and electrical clearances as stipulated in provisions of Chapter –V and V-A, Electric Traction "Schedule of Dimensions of 1676 mm Gauge (BG) revised 2004" with latest Addendum & Corrigendum Slips is not violated and strictly followed to ensure its safe running.
3.4.3.	In addition to above, the Chief Electrical Engineer of the Concerned Railway shall impose any temporary speed restriction on the basis of personal knowledge, experience of the sectional OHE and the field conditions prevailing on the particular section.

3.5.	**ROLLING STOCK STIPULATIONS**

3.5.1.	Safety items of the wagon shall be maintained as per standard contained in the following documents (i) Maintenance manual for Bogie Liquefied Anhydrous Ammonia Tank Wagon No. G-79. (ii) Bogie maintenance manual No G-95. (iii) Air brake maintenance manual No G-97. (iv) Coupler maintenance manual No G-80 for workshop staff. (v) Coupler maintenance manual No G-76 for line staff.
3.5.2.	Based on the above cited maintenance instructions and other relevant Rolling Stock documents cited in the Annexure-I of the speed certificate, before the commencement of the operation of BTALNM wagon, the PCME of the concerned Railway shall arrange to certify the track worthiness and safety of the Rolling Stock.
3.5.3.	Brake of locomotive and the rake of wagons shall be in good working order during the operation.

3.6.	**GENERAL STIPULATIONS**

3.6.1.	All the permanent and temporary speed restrictions enforced and those that may

	be imposed from time to time due to track, bridges, curves, signalling and interlocking etc. shall be observed. In this connection, the speed on curves shall be in accordance with Para 3.1.3 of this speed certificate.
3.6.2.	For placement/movement of wagon on any private or assisted siding for loading or unloading the consignments, the Chief Engineer of concerned Zonal Railway shall be referred to.
3.6.3.	The design of the wagon does not infringe any clause of Chapter IV (A) and also the profile of maximum moving dimensions diagram of IRSOD 1D-2004.

ENCLOSURES: / संलग्नकः

i)	RDSO's Drg. No. WD-14002-S-52 Alt.-Nil
ii)	Annexure-I
iii)	Annexure-II (Soft/PDF copies in CD)

Digitally signed by VINAY KUMAR AGARWAL
Date:Fri Aug 07 21:57:38 IST 2020
Reason: Approved

(वी. के. अग्रवाल)
कार्यकारी निदेशक मानक/चालन शक्ति

<u>प्रतिलिपिः</u>

1. सचिव, {यांत्रिक/विद्युत/इंजीनियरिंग(जी)}, रेलवे बोर्ड, रेल भवन, नई दिल्ली– 110001
2. मुख्य रेल संरक्षा आयुक्त, अशोक मार्ग, लखनऊ–226001
3. महाप्रबन्धक (यांत्रिक/विद्युत/संचालन/संकेत एवं दूरसंचार)
   - i) मध्य रेलवे, छत्रपति शिवाजी टर्मिनस मुम्बई– 400 001
   - ii) पूर्व रेलवे, फेयरली प्लेस, कोलकाता– 700 001
   - iii) उत्तर रेलवे, बडौदा हाऊस, नइ दिल्ली– 110001
   - iv) पूर्वोत्तर रेलवे, गोरखपुर– 273001
   - v) पूर्वोत्तर फ्रन्टियर रेलवे, माली गॉव ,गुवाहाटी– 781 011
   - vi) दक्षिण रेलवे, एनेक्सी, पार्क टाऊन, चेन्नई– 600 003
   - vii) दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद– 500 071
   - viii) दक्षिण पूव रेलवे, गार्डनरीच, कोलकाता– 700 043
   - ix) पश्चिम रेलवे, चर्चगेट, मुम्बई– 400020
   - x) उत्तर मध्य रेलवे, प्रयागराज– 211 001
   - xi) उत्तर पश्चिम रेलवे, जयपुर– 302 006
   - xii) पूर्व मध्य रेलवे, हाजीपुर– 844 101
   - xiii) पूर्वतटीय रेलवे, रेलवे कॉम्पलेक्स, भुवनेश्वर– 751 023
   - xiv) दक्षिण पश्चिम रेलवे, हुबली– 580 023
   - xv) पश्चिम मध्य रेलवे, जबलपुर– 482 001
   - xvi) दक्षिण पूर्व मध्य रेलवे, बिलासपुर– 495 004

4. अध्यक्ष एवं प्रबन्ध निदेशक, कोंकण रेलवे कारपोरेशन लिमिटेड, बेलापुर भवन, सेक्टर–11, सी.बी.डी.बेलापुर नवी मुम्बई–400 614.
5. **जी. जी, एम.**(यांत्रिक/विद्युत/संचालन/संकेत एवं दूरसंचार) डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इंडिया लि., 5वॉ तल, प्रगति मैदान मेट्रो स्टेशन बिल्डिंग कम्पलेक्स, नई दिल्ली–110 001.

ENCLOSURES: / संलग्नकः

i)	RDSO's Drg. No. WD-14002-S-52 Alt.-Nil
ii)	Annexure-I
iii)	Annexure-II (Soft/PDF copies in CD)

/

(वी. के. अग्रवाल)
कार्यकारी निदेशक मानक/चालन शक्ति

Annexure-I

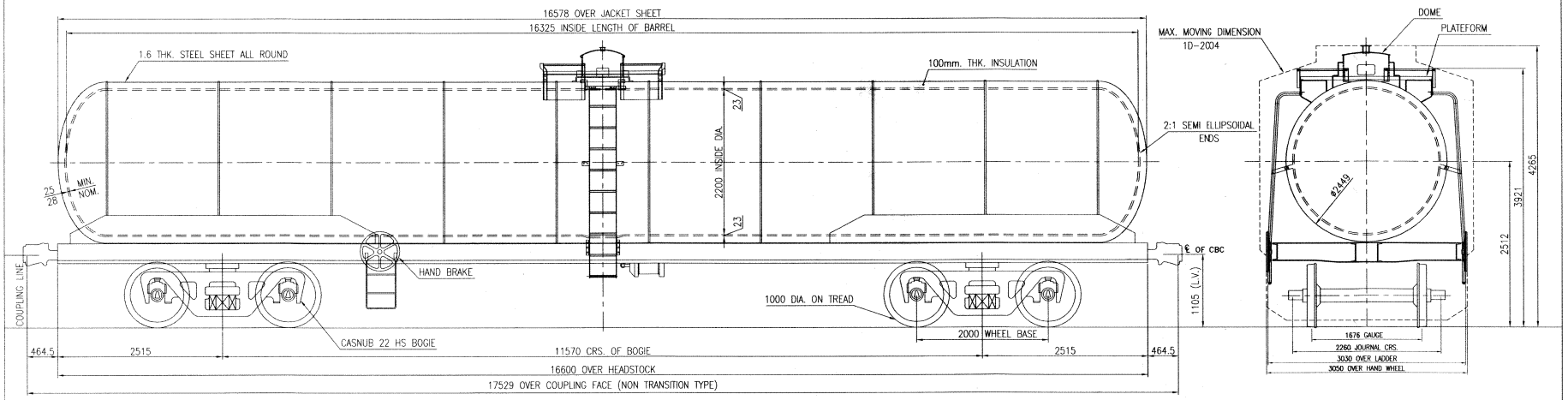
Salient features of 20.03t axle load BTALNM Wagon

S No.	Description	Details
1	Principal parameter of Rolling Stock	Diagram Drawing No. WD-14002-S-52 Alt. Nil a. Length over coupler = 17529 mm b. Bogie Center = 11570 mm c. Wheel Base = 2000 mm d. Axle load (loaded) = 20.03 t e. Max. height from Rail Level = 4265 mm
2	Bogie and Wheel	a. Casnub 22HS bogie to RDSO Spec. No. WD-17-CASNUB-22HS-BOGIE-92 b. 1000 mm diameter wheels to RDSO Drg. No. WD-89025-S-01 and Specification No. R-19/93 Pt-I
3	Brake system	Twin pipe graduated release air brake fitted with Underframe Mounted system.
4	Brake rigging, brake ratio and parking brake	a. Brake rigging to RDSO drawing No. WD-14002-S-57 and Brake Diagram No. WD-14002-S-61 b. Brake Ratio (loaded)=44.4% c. Brake Ratio (empty)=74.2% d. Hand (parking) Brake=14.6%
5	Coupler and buffer	a. Coupler to RDSO specification No. 48-BD-08/ WD-70-BD-10 b. Draft Gear to RDSO specification No. 49-BD-08
6	Safety Item	a. Dome Fittings to RDSO Drg. No. WCS-7004-S-61
7	Periodic maintenance schedules and standards (safety limits) to be followed in respect to safety items	a. Bogie maintenance manual G-95 b. For wheel and axle refer Para 2.8 of chapter 2 of IRCA Part-III-1973 c. Coupler maintenance manual G-76 (For line staff) d. Coupler maintenance manual G-80 (For workshop staff) e. G-79 “Maintenance manual for Bogie Liquefied Anhydrous Ammonia Tank Wagon”. f. G-87 “Safe handling of hazardous chemicals Transported in rail tankers”.
8	Instructions regarding operation of rolling stock in case of failure of any of the safety items	
9	Details of carrying capacity and mechanism to control overloading	a. Carrying capacity 32.13 t

Annexure-II

(List of documents referred in speed certificate of 20.03 t BTALNM wagon. The copy of these documents available in the CD enclosed with the speed certificate).

a. WD-17-Casnub-22HS Bogies-92
b. RDSO Drg. No. WD-89025-S-01
c. RDSO Drg. No. BA-11154
d. Wheel Specification No. R 19/93 Pt. I
e. Para 2.8 of Chapter 2 of IRCA Part-III
f. Brake Diagram Drg. No. WD-14002-S-61
g. Brake Rigging Drg. No. WD-14002-S-57
h. CBC Spec. No.
    (i) 48-BD-08
    (ii) WD-70-BD-10
i. Draft Gear Spec. No. 49-BD-08
j. Inspection & Maintenance Manual of CBC
    (i) G-80 (For workshop staff)
    (ii) G-76 (For line staff)
k. RDSO Drg. No. WCS-7004-S/61 for Dome fittings.
l. G-87 (Safe handling of hazardous chemicals Transported in rail tankers).
m. G-95 (Bogie Maintenance Manual).
n. G-79 (Maintenance manual for Bogie Liquefied Anhydrous Ammonia Tank Wagon).
o. G-97 (Air Brake Maintenance manual)
p. Indian Railway Permanent Way Manual June 2020.
q. USFD-2012
r. Oscillation trial Report No. MT-1620
s. Railway Board letter No. 65/WDO/SR/26 dtd 19/20.10.1966
t. Drg. No. WD-14002-S-52 Alt.-Nil



SUMMARY OF WEIGHTS (ESTIMATED)

DESCRIPTION	WEIGHT (TONNES)
UNDERFRAME STRUCTURE COMPLETE	5.960
TWO CBC COMPLETE (NON TRANSITION) WITH YOKE AND DRAFT GEAR	1.320
TWO BOGIES COMPLETE	10.836
UNDERFRAME, BRAKE GEAR, AIR BRAKE EQUIPMENT INCLUDING PIPES	0.800
TWO NUMBERS TANK CRADLES	1.660
TANK BARREL COMPLETE WITH ALL FITTINGS	23.931
INSULATION AND JACKET COMPLETE	2.715
PLATFORM AND LADDER	0.348
NUTS, BOLTS AND RIVITS	0.150
ROLLING MARGINE ON UNDERFRAME STRUCTURE	0.250
TARE	47.970
CARRYING CAPACITY	32.130
GROSS ON RAIL	80.100
VOLUMETRIC CAPACITY (CU. M.)	60.663
MAX. AXLE LOAD	20.03

LEADING FEATURES

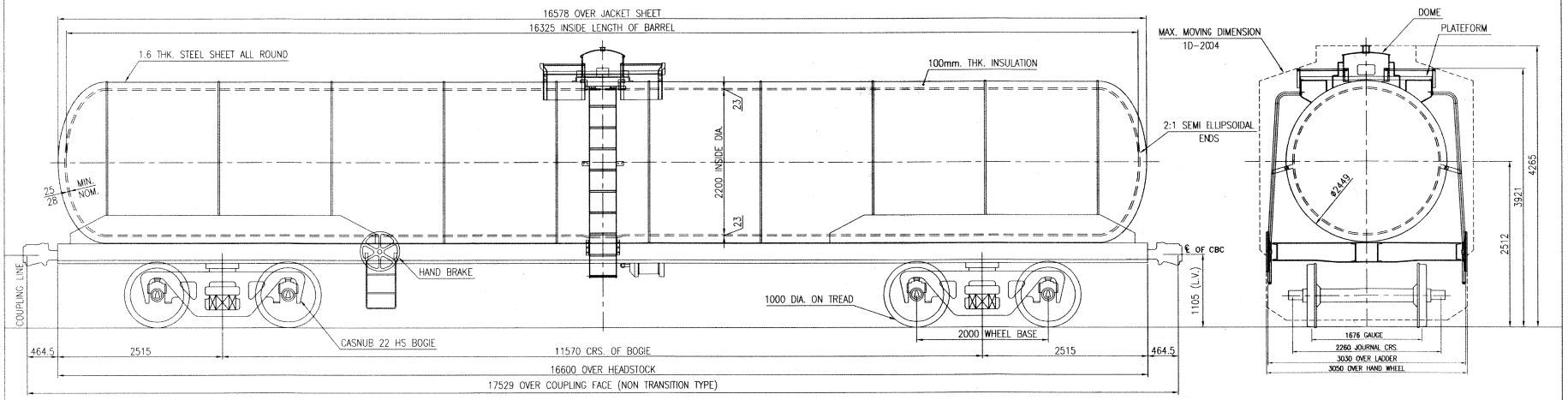
1. LADING: LIQUID ANHYDROUS AMMONIA (NH_3).
2. DESIGN TEMPERATURE: −50°C TO 55°C
3. WORKING PRESSURE: 22.15 Kg/cm2.
4. TEST PRESSURE: 33.25 Kg/cm2.
5. SPECIFICATION FOR MAINTENANCE AND INSPECTION: IS 2825 WITH LATEST AMENDMENTS.
6. LOADING TEMPERATURE OF AMMONIA: −33°C (−28°F).
7. STEEL USED FOR BARREL: SUITABLE FOR LOW TEMPERATURE SERVICE.
8. MAX. LOADING CAPACITY OF THE LIQUID AT 55°C= 95% OF TOTAL VOLUME.
9. MAX. LOADING CAPACITY BY WEIGHT= 32.130t
10. BARREL: FULLY INSULATED.
11. LOADING AND UNLOADING:- FROM TOP ONLY.
12. DOME FITTED WITH:
    - (I) SAFETY VALVE.
    - (II) LIQUID AND GAS VALVE.
    - (III) GAUGING DEVICE.
    - (IV) SAMPLER VALVE.
    - (V) THERMOMETER WELL.

MOHAM MAD SAIF
Digitally signed by MOHAMMAD SAIF
Date: 2020.07.20 13:17:15 +05'30'

NOTE (for reference): The Drg. redrawn on Auto CAD (with modification for CASNUB 22HS Bogie) based on RDSO Drg No. WD-84058-S-02 Alt. 2)

PRELIMINARY SKETCH		ONLY FOR PROTOTYPE APPLICATION UNDER GUIDANCE OF R.D.S.O. (WAGON)
SUPERSEDED BY		BOGIE AMMONIA TANK WAGON TYPE BTALNM² (VARIANT-B)
SUPERSEDES	DATE	
SCALE	PASSED	S/In
-	CHECKED	6/14
	DRAWN R.K.T.	04/14
	TRACED	
	J.SHEET NO-14002	01/14
ASSEMBLY DRAWING	B.G. R.D.S.O. [W] GROUP	DIAGRAM WD-14002-S-52

File No.RDSO-MW0SPD(TANK)/3/2020-O/o PED/SW/RDSO



SUMMARY OF WEIGHTS (ESTIMATED)

DESCRIPTION	WEIGHT (TONNES)
UNDERFRAME STRUCTURE COMPLETE	5.960
TWO CBC COMPLETE (NON TRANSITION) WITH YOKE AND DRAFT GEAR	1.320
TWO BOGIES COMPLETE	10.836
UNDERFRAME, BRAKE GEAR, AIR BRAKE EQUIPMENT INCLUDING PIPES	0.800
TWO NUMBERS TANK CRADLES	1.660
TANK BARREL COMPLETE WITH ALL FITTINGS	23.931
INSULATION AND JACKET COMPLETE	2.715
PLATFORM AND LADDER	0.348
NUTS, BOLTS AND RIVITS	0.150
ROLLING MARGINE ON UNDERFRAME STRUCTURE	0.250
TARE	47.970
CARRYING CAPACITY	32.130
GROSS ON RAIL	80.100
VOLUMETRIC CAPACITY (CU. M.)	60.663
MAX. AXLE LOAD	20.03

LEADING FEATURES

1. LADING: LIQUID ANHYDROUS AMMONIA (NH_3).
2. DESIGN TEMPERATURE: −50°C TO 55°C
3. WORKING PRESSURE: 22.15 Kg/cm2.
4. TEST PRESSURE: 33.25 Kg/cm2.
5. SPECIFICATION FOR MAINTENANCE AND INSPECTION: IS 2825 WITH LATEST AMENDMENTS.
6. LOADING TEMPERATURE OF AMMONIA: −33°C (−28°F).
7. STEEL USED FOR BARREL: SUITABLE FOR LOW TEMPERATURE SERVICE.
8. MAX. LOADING CAPACITY OF THE LIQUID AT 55°C= 95% OF TOTAL VOLUME.
9. MAX. LOADING CAPACITY BY WEIGHT= 32.130t
10. BARREL: FULLY INSULATED.
11. LOADING AND UNLOADING:- FROM TOP ONLY.
12. DOME FITTED WITH:
    - (I) SAFETY VALVE.
    - (II) LIQUID AND GAS VALVE.
    - (III) GAUGING DEVICE.
    - (IV) SAMPLER VALVE.
    - (V) THERMOMETER WELL.

MOHAM MAD SAIF
Digitally signed by MOHAMMAD SAIF
Date: 2020.07.20 13:17:15 +05'30'

NOTE (for reference): The Drg. redrawn on Auto CAD (with modification for CASNUB 22HS Bogie) based on RDSO Drg No. WD-84058-S-02 Alt. 2)

ASSEMBLY DRAWING

PRELIMINARY SKETCH

ONLY FOR PROTOTYPE APPLICATION UNDER GUIDANCE OF R.D.S.O. (WAGON)

SUPERSEDED BY
SUPERSEDES
DATE

SCALE	PASSED	S/114
	CHECKED	6/14
	DRAWN	R.K.T. 04/14
	TRACED	
	J.SHEET	WD-14002 01/14

BOGIE AMMONIA TANK WAGON TYPE BTALNM² (VARIANT-B)

DIAGRAM

B.G. | R.D.S.O. [W] | GROUP | WD-14002-S-52