

व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT
(INITIAL)

संख्याNo: T-89/1390
माहMonth: June , 2022
Validity: 31.05.2029



SANAP ENGINEERING WORKS SANAP 5 TT TIPPING TRACTOR TRAILER



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि, सहकारिता एवं किसान कल्याण विभाग

Department of Agriculture and Farmers Welfare

दक्षिणी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Southern Region Farm Machinery Training and Testing Institute

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T-89/1390	SANAP ENGINEERING WORKS SANAP 5 TT TIPPING TRACTOR TRAILER	COMMERCIAL (ICT)
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Manufacturer : M/s. SANAP Engineering Works, AT-
Brahmaanwade, Gat No. 160, Sinnar, Nashik, Tal.
Sinnar, Dist. Nashik-422101, Maharashtra, India
Applicant : The Manufacturer

SANAP ENGINEERING WORKS SANAP 5 TT TIPPING TRACTOR TRAILER

Report No. : **T-89/1390**

Month: June

Year: 2022



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Type of test : INITIAL COMMERCIAL TEST

Period of test : 31.05.2022 to 13.06.2022

Test Report No. : **T-89/1390**

Month / Year of release : June, 2022

- i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
- ii) The machine submitted for testing is directly submitted by applicant, Hence method of selection of unknown.
- iii) The results presented in this report do not in any way attribute to the durability of the machine.
- iv) This report should not be reproduced in part or full without prior permission of the Director, Southern Region Farm Machinery Training and Testing Institute, Garladinne, Anantapur (A.P.).
- V) This is a report on Commercial Test of tractor trailer named "SANAP ENGINEERING WORKS SANAP 5 TT TIPPING TRACTOR TRAILER". **This report is valid up to 31.05.2029, Vide Ministry's O.M. No. 13-24/2018-M&T (I&P) dated 19.09.2018.**

SELECTED CONVERSIONS

S. No	Units	Conversion Factor
1	Force	
	1 kgf	9.80665 N
		2.20462 lbf
2	Power	
	1 hp	1.01387 metric hp (Ps)
		745.7 W
	1 Ps	735.5 W
	1 kW	1.35962 Ps
3	Pressure	
	1 psi	6.895 kPa
	1 kgf/cm ²	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm ²
	1 mm of Hg	1.3332 m-bar

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Type of test : INITIAL COMMERCIAL TEST

Name of machine : SANAP ENGINEERING WORKS SANAP 5 TT
TIPPING TRACTOR TRAILER

Make : SANAP ENGINEERING WORKS SANAP 5 TT
TIPPING

Model : SANAP 5TT

Type : Hydraulic, Tipping

Manufactured by : M/s. SANAP Engineering Works, AT-
Brahmaanwade, Gat No. 160, Sinnar, Nashik, Tal.
Sinnar, Dist. Nashik-422101, Maharashtra, India

Applicant : The manufacturer

TESTED BY

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1. SCOPE OF TEST

The scope of test was to check and assess the following :

1.1 Laboratory test :

- Checking of specifications
- Trailer platform lifting test
- Load maintenance test

1.2 - Haulage performance test

2. TEST PROCEDURE /TEST CODES

There is no Indian Standard/Test Code available for testing of tractor operated trailer as such. The guidelines, however, have been taken from the following:

- i) IS 8213:2000 : Agricultural Tractor Trailer specification
(Reaffirmed 2020)
- ii) IS 12371:1988 : Technical Requirement for Single-Acting
(Reaffirmed 2019) Telescopic Tipping Cylinders for Agricultural Trailers
- iii) IS 11270:1985 : Technical Requirements for Ring-Type
(Reaffirmed 2019) Hitches for Agricultural Trailers
- iv) IS 9253:2013 : Agricultural Tractors-Field Performance and
(Reaffirmed 2019) Haulage Tests - Guidelines
- v) IS 10806:2003 : Trailers for power tillers
(Reaffirmed 2016)

3. METHOD OF SELECTION

The test sample was directly submitted by the applicant for test at this Institute. Hence the method of selection is not known.

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4. SPECIFICATIONS

4.1 **General :**

Manufacturer	:	M/s. SANAP Engineering Works, AT-Brahmaanwade, Gat No. 160, Sinnar, Nashik, Tal. Sinnar, Dist. Nashik-422101, Maharashtra, India
Applicant	:	The manufacturer
Name of machine	:	SANAP ENGINEERING WORKS SANAP 5 TT TIPPING TRACTOR TRAILER
Class of vehicle	:	2 wheel trailer
Type	:	Hydraulic, Rear side Tipping
Make	:	SANAP ENGINEERING WORKS
Model	:	SANAP 5 TT
Type of body	:	Rectangular(Rear side tipping)
Type of vehicle/category	:	R2(R2 for GVW up to 5T)
Chassis serial number	:	5T2W0101
Year of manufacture	:	2021
Recommended tractor power, (hp) (as declared by the applicant)	:	35 hp & above
ULW (Unladen weight), (kg)	:	1620
Pay load recommended, (kg)	:	5000
GVW (Gross vehicle weight), (kg)	:	6620
Height of hitch from ground level, (mm)	:	500
Inner size of platform (LxWxH), (mm)	:	2970x1760x610
Inner volume of platform, (m ³)	:	3.19
Thickness of sheet metal, (mm)	:	3.12/5.04

4.2 **Details of prime mover used :**

Type	:	General purpose tractor
Tractor	:	John deere 5310
Chassis No./Engine no.	:	P45310S006805/PY30290114658
Max. PTO Power, kW (hp)	:	37.4/50.8



Fig. 1: SANAP ENGINEERING WORKS SANAP 5 TT TIPPING TRACTOR TRAILER

Keys:

- | | |
|-----------------------|------------------|
| 1. Side door | 5. Parking stand |
| 2. Hydraulic oil pipe | 6. Trailer wheel |
| 3. Trailer chassis | 7. Hub assembly |
| 4. Hitch | |

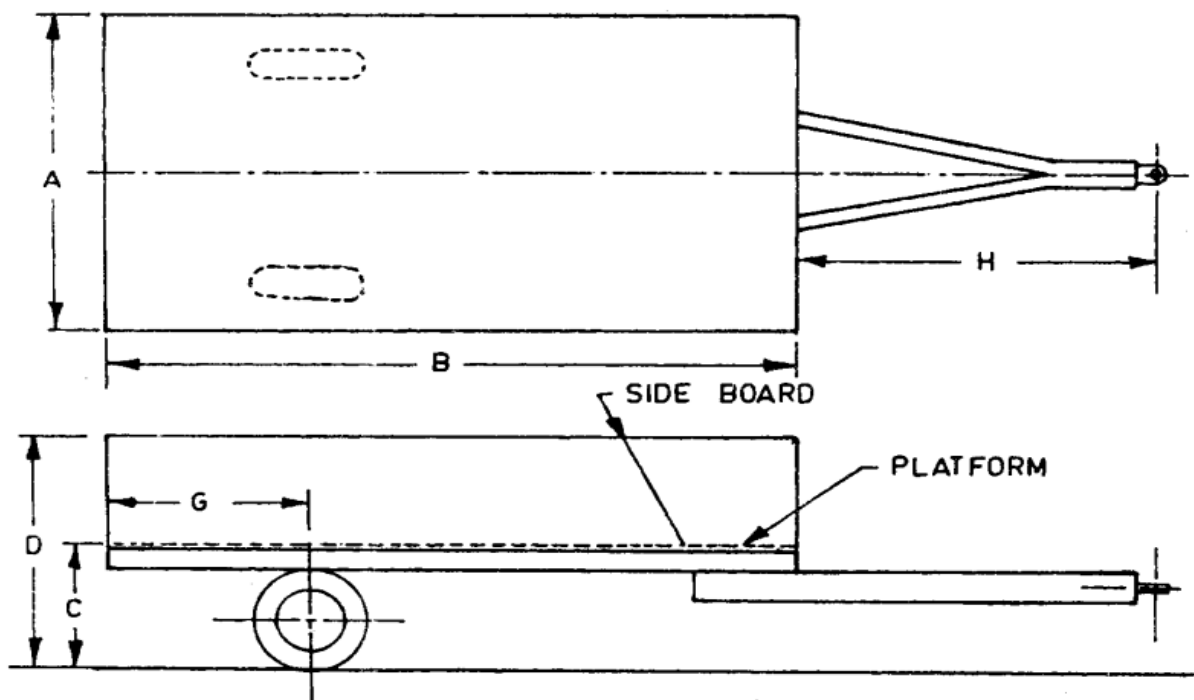


Fig. 2: Tractor Semi Trailer as per IS 8213:2020

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Sl. No.	Notation	Requirement	Observed	Conformity
1.	A	Not exceed 2.5m	1.84	Conforms
2.	B	Not exceed 5 meter for trailers up to 5 tonnes capacity	3.05	Conforms
3.	C	Not more than 1.5 m	1.02	Conforms
4.	D	Not more than 2.2 m	1.72	Conforms
5.	E	NA	---	---
6.	F	NA	---	---
7.	G	---	1.08	---
8.	H	---	1.16	---
9.	Ground clearance	Not be less than 300mm	400	Conforms

4.3 Trailer chassis

Shape : Rectangular
Material : MS
Construction details : It is welded in rectangular shape with 'C' channels:
1. 3600x200x80/80x9.43 (t)- 2Nos.
2. 1040x100x55/55x7.55 (t)- 1No.

4.3.1 Trailer bucket/Tipping bucket:

Type : Tipping bucket
Shape : Rectangular
Capacity, (m³) : 3.19
Material : MS
Construction details : It is supported with 6 Nos. of side doors & supported on 6 Nos. of poles. Front door is welded & other Five doors are hinged to the platform at one side & locked with two lock hooks for each door.

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4.3.2 Trailer bucket support

Chassis/frame:

- Shape : Rectangular
Material : MS
Construction details : It is welded in rectangular shape with
: the following 'C' channels.
1. 33050x130x65/65x7.33 (t)- 2Nos.
 2. 1070x120x70/70x7.59 (t)- 2Nos.
 3. 1820x20x40/40x7.71 (t)- 15Nos.

4.3.3 Lifting assembly

- : The ram cylinder's one end is connected to the trailer chassis and another end is connected to the lifting assembly frame.

4.3.3.1 Details of ram cylinder

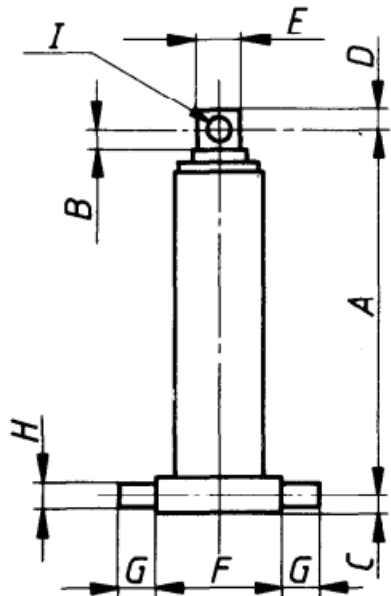
- Number : One
Type of ram cylinder : Single acting, double piston, telescopic tipping cylinder.
Make : Radhika
Capacity (t) : 10 ton
Size of ram cylinder, (mm)
- a) 1st piston dia. : 46.60
 - b) 2nd piston dia. : 87.59
 - c) Cylinder dia. : 130.49
 - d) Stroke length : 850
- Stroke length of ram cylinder during lifting of box assembly, (mm) : 1570

Details of hydraulic pipes , (mm)		Metal pipe	Rubber pipe cylinder side	Rubber pipe tractor side
Length		1240	520	1010
Dia.		22.01	20.61	20.60
Make		---	Radhika	Radhika

- Number & Location : One

- Construction details : The ram cylinder's one end is fitted to main chassis with the help of round pin and another end is fitted to box assembly with the help of round pin.

- 4.3.3.2 Details of lifting assembly** :
- Size of supporting frame (mm) : 1080x150/150 box channel
- Size of flats, (mm) : 1. 100x90x21.43 (t)- 2Nos.
2. 150x105x15.71 (t)- 2Nos.
- Construction of assembly : Total lifting section is mounted on chassis and welded.



- A = Effective closed length
- B = Cylinder head clearance
- C = Length beyond mounting centre - cylinder casing
- D = Length beyond mounting centre - piston rod
- E = Piston rod diameter, i.e. the effective diameter at the point of attachment of the cylinder assembly to the vehicle
- F = Pivot pin separation
- G = Pivot pin length
- H = Pivot pin diameter
- I = Diameter of hole in piston rod for attachment of cylinder assembly to vehicle

Fig. 3: Dimensions of Cylinder (Type 1) as per IS 12371:2019

Sl. No.	Notation	Requirement, (mm)	Observed	Conformity
1.	A	670 Max.	670	Conforms
2.	B	37 Min.	54	Conforms
3.	C	25 Max.	24.65	Conforms
4.	D	28 Max.	24.0	Conforms
5.	E	70± 5	70.05	Conforms
6.	F	130 (+0, - 5)	75	Does not conform
7.	G	45 Min.	72	Conforms
8.	H (d 10)	45	42	Does not conform
9.	I (H12)	37	37.0	Conforms

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- 4.4 Axle hub assembly:**
 Type of axle shaft : Square
 Size, (mm) : 1680x73/73
 Number : One
 No. & type of bearing : On each side 02 nos. of taper roller bearings (32213&32216) are provided at each side
- 4.5 Trailer wheel:**
 Type : Pneumatic
 Size : 9.0-16,18 PR
 Track width, (mm) : 1500
 Make of tyre : J.K. TYRE SONA 5
 Numbers : Two
 Distance between centre of rear wheel of tractor to the centre of trailer wheel, (mm) : 3820
 Max. loading capacity of each tyre at kPa inflation pressure, (Kg)
 Max. load single : 2360 Kg at 760 kPa cold
 Max. load dual : Not specified
 Recommended inflation pressure, (Psi) : 115
- 4.6 Tool box details:**
 Shape : Rectangular
 Material : MS
 Size, (mm) : 450x230x230x1.95 (t)
 Location : At bottom RHS of trailer
- 4.7 Details of hitch beam :**
 Length of 'C' channels/beam, (mm) : 1680x150x80/80-02 Nos. box type
 Width of Beam, (mm) :
 Maximum : 480
 Minimum : 180
 Method of mounting : Welded to the main chassis
- 4.8 Details of parking stand:**
 Type : Jack type
 Size, (mm) : 780x60/60 box type
 Height from ground level, (mm) : 460

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Provision for mounting : By lifting and Locked by a with pin of size 418.75xØ16.13

4.9 Toe mechanism:

Type : Ring type hitch

Details : One MS rod of dia. Ø 39.10 mm is made as a rings item, both ends are connected to the solid rod of size Ø 62.70.

Dia. of hook (OD/ID), (mm) : 118.80/39.18

Total length of hook, (mm) : 410

Height of hook from ground level, (mm) : 500

Threaded portion length, (mm) : 80.0

Dia. of threaded portion, (mm) : 55.34

Dia. of shaft, (mm) : 62.70

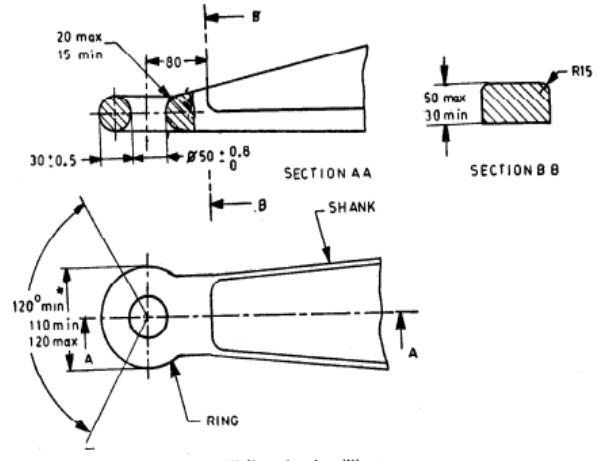
Height from main chassis to bottom of bucket in tipping position, (mm) : 2350

Horizontal distance from centre of trailer axle to centre of toe hitch, (mm) : 3135

Horizontal distance from centre of axle to rear end of trailer, (mm) : 1080

4.9.1 Spring Details : Not provided

4.9.2 Suspension details : **Welded to axle**



All dimensions in millimetres.

* Zone of ring having a constant section of diameter 30 to permit a turning angle of 60° either side the longitudinal centre line.

Fig. 4 (a): Dimensions of ring as per IS 11270:1980 (Reaffirmed 1999)

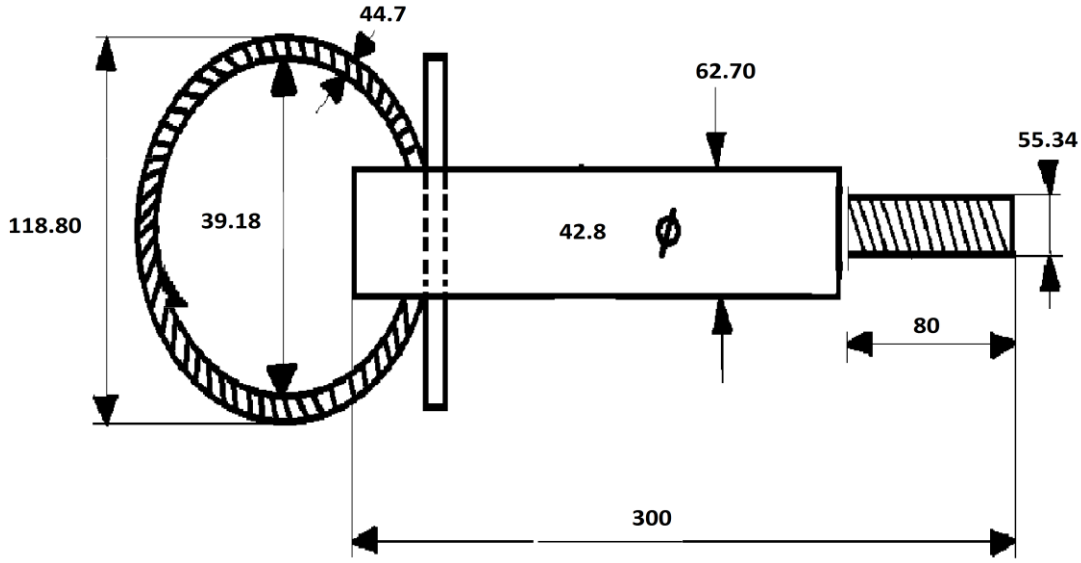


Fig. 4 (b) Dimensions of ring as observed, in mm

4.10 Lubricating points :

Sl. No.	Location	Recommended lubricant	As used during test	Lubricating schedule
1	Hub	MP Grease	As recommended	After every month checking and filling
2	At the bottom of bucket spring shackle with spring leaves	MP Grease		After every week

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4.11 Marking/Labeling :

A metallic labeling plate is riveted front of c chassis bucket with the following information:

MAKE			
SANAP ENGINEERING WORKS			
CHASIS NO.	SEW 5T-TW-0101		
MODEL.	SANAP 5 T.T	YEAR OF MFG.	2022/02
UN LADEN WEIGHT.	1.770	PAY LOAD	5000
GROSS LADEN WEIGHT.	6.77		
TRACTOR REQUIRED: 35 HP AND ABOVE			
MANUFACTURED BY: SANAP ENGINEERING WORKS , AT POST- BRAHAMAAANWADE, GAT NO.160.160, TAL – SINNAR DIST, NASHIK, 422101 RAMDAS SANAP-9423475872 PANDURANG SANAP – 9326769256 OFFICE -7720064201 GSTIN-27BFQPS1155E1Z8 Web-WWW.sanapagroengineering.com			

4.12 Safety devices :

1. Dust cover is provided for hub at both sides.
2. Two locking levers are provided for side doors and at rear door.
3. Back side two hooks are provided

4.13 Other details:

1. Front & LHS steps is provided to get into trailer
2. Each side four hooks provided for tying rope

4.14 Overall dimensions, (mm) :

Length	: 4330
Width	: 1970
Height	: 1930
Ground clearance	: 400

4.15 Mass, (kg) : 1620

4.16 Colour of trailer :

Trailer	: Orange
Chassis & axle	: Black

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4.17 Material requirements for components of Trailer:

Sl. No	Name of Component	Material (As per clause 5.1, IS 8213:2000)	Material used as per applicant	Conformity to IS
i)	Chassis	Mild steel	Mild steel	Conforms
i)	Draw bar	Mild steel	Not applicable	---
iii)	Tow eye or tow jaw	Carbon steel	Carbon steel	Conforms
iv)	Platform	Mild steel	Mild steel	Conforms
v)	Side boards	Mild steel Timber	Mild steel	Conforms
vi)	Leaf spring	Spring steel	Spring steel	Conforms
vii)	Axle	Structural steel	Structural steel	Conforms
viii)	Hub	Cast iron	Cast iron	Conforms
ix)	Brake drum	Cast iron	Cast iron	Conforms
x)	Cap	Cast iron Mild steel	Mild steel	Conforms
xi)	Washer	Mild steel	Mild steel	Conforms

NA = Not Applicable

4.18 Material of construction of various components of trailer axles:

Sl. No.	Name of Component	Material (As per clause A-3, IS 10806:2003)	Material used as per applicant	Conformity to IS
i)	Brake drum	Cast iron Steel	NA	---
i)	Backing plate	Cast iron Steel	NA	---
iii)	Brake shoe	Cast iron Steel Cast aluminum	NA	---
iv)	Brake cam shaft	Carbon steel	NA	---
v)	Brake shoe pin	Carbon steel	NA	---
vi)	Axle	Carbon steel	Structural steel	Does not conform
vii)	Hub	Cast iron	Cast iron	Conforms
viii)	Dust cover/cap	Mild steel	Mild steel	Conforms

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5. CONFORMITY TO INDIAN STANDARDS

Specification for Tractor trailer (IS 8213:2020):

Clause	Specified requirements as per IS	As observed	Conformity to IS
4	Type		
4.1	The agricultural trailers shall be of following two types: a) Balanced trailer (double axel), and b) Semi-trailer (single axle)	Semi Trailer (Single axle)	Conforms
6.0	Capacity		
6.1	The capacity of a trailer shall be its gross load and shall be 2, 3, 4, 5, 6, 8 and 10 tonnes. The gross load along with the pay load shall be declared by the manufacturer. The declared capacity shall not vary by ± 5 percent.	Declared capacity is 5 tonnes	Conforms
6.1.1	The capacity of the single-axle trailers shall be not more than 5 tonnes.	5 tonnes	Conforms
7.0	Dimensions		
7.2	The overall width of the trailer (see A in Fig. 2) measured between the extreme points shall not exceed 2.5 m.	1.84	Conforms
7.3	The overall length of the platform (see B in Fig. 2) shall not exceed the following; a) 5 m for trailers up to 5 tonnes capacity, and b) 6.7 m for trailers above 5 tonnes capacity	3.055	Conforms
7.4	The height of the trailer, with tyres inflated at the recommended pressure, when measured from the level supporting surface to the top of the platform (see C in Fig. 2) shall be not more than 1.5 m.	1.02	Conforms
7.5	The height of the trailer, with tyres inflated at the recommended pressure,	1.72	Conforms

	when measured from the level supporting surface to the top of the sideboard (see D in Fig. 2) shall be not more than 2.2 m		
7.7	Ground clearance shall not be less than 300 mm	400	Conforms
8.0	Constructional requirements		
8.1	The loading platform may be plain or provided with hinged or fixed sideboards. If trailer is provided with sideboards, some kind of locking provision shall be provided to keep it vertical. This can be met by giving a latching system at the top of the vertical posts fitted to the platform. The hinges by which sideboards are fixed shall be provided with split pins to restrict its lateral motion.	Plain, hinge side boards with bolts & nuts, locking provided	Conforms
8.2	The trailers shall be provided with lashing hooks for tying down the load.	Provided	Conforms
8.3	For single-axle trailer, tow eye of the drawbar or hitch of the trailer, when fully loaded maybe parallel to the level surface after hitching with towing tractor. In the towing hitch, a suitable shock absorbing device shall be provided. The hitch height of trailer should always be below rear axle height of the tractor.	Parallel to the level surface	Conforms
		Not provided	Does not conform
	For balanced trailer drawbar or hitch of the trailer shall be of hinged type so that from trailer is not transferred to the towing power tiller.	Not applicable	---
8.4	Tow eye of the trailer shall be capable of rotating at 360° angle to take on even rigid trailer hook of the towing power tiller. Ring type hitches shall conform to IS 11270	Rotatable	Conforms
8.5	For balanced trailers, the front axle shall have the capability to swivel to a maximum of 120° (60° on either side) about the vertical axis.	Not applicable	---

8.6	The trailer shall be fitted with pneumatic tyres and rims conforming to IS 13154 and 10694 (Part 6) respectively.	Pneumatic tyres & rims are provided but not conform IS13154 and 10694 (Part 6)	Does not Conform
8.7	The axle(s) shall conform to requirements specified in Annex A.	-----	Does not Conform
8.8	The trailer shall be provided with suitable spring suspension (see IS 1135) for recommended load carrying capacity.	Suspension of leaf spring is provided	Conforms
8.9	Trailers shall have service (overrun) and parking brake. It shall be ensured that during operation of service or parking brake, the brakes at both the wheels of trailer are activated simultaneously.	Brake is not provided	Does not conform
8.9.1	The service brakes shall be capable of a deceleration of 2.5 m/s ² measured in accordance with tile method described in Annex B with operating brakes pedal force not exceeding 600 N and 400 N in case of foot operated and hand operated brakes respectively	Brake is not provided	Does not conform
8.9.2	The parking brake shall hold fully laden trailer on a 12 percent slope uphill or downhill. The maximum force to operate a hand lever shall not exceed 400 N. The parking brake shall operate on the same drum and shoe or disc and pad as the service brake.	Brake is not provided	Does not conform
8.10	Hydraulic ram of suitable capacity compatible with tractor hydraulic shall be provided in case of tipping type. The ram may be used in single or tandem as per need and the operating pressure shall not exceed 13.8 MPa.	N.A	--
8.11	Tipping angle of the body, in case of tipping type, shall be 42° to 50°.	48°	Conforms
9	LIGHTING REQUIREMENTS		
9.1	The trailer shall be fitted with two red colored reflectors at rear sides and two white colored reflectors on front sides	Not provided	Does not conform

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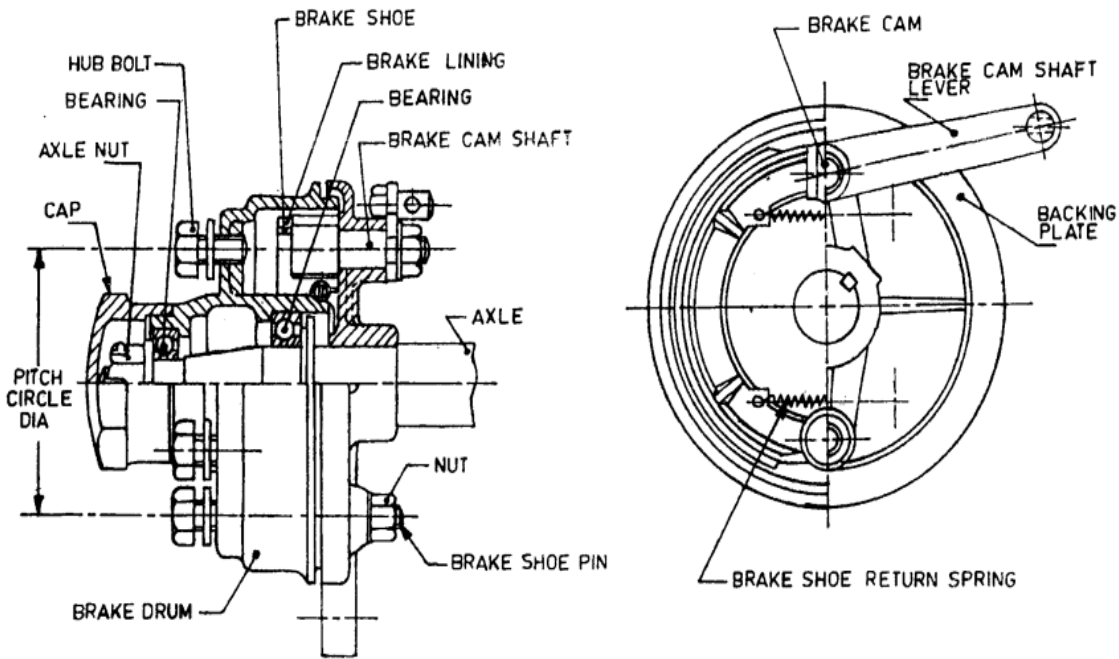
	at a distance not more than 150 mm from extreme ends to the centre of reflectors. The reflectors shall be round with reflecting area not less than 3000 mm ² . Rear reflectors may be incorporated as part of lensing in tail lamps described in 9.2,		
9.2	Every trailer shall be provided with two tail lights of red colour at the rear and conforming to IS 3628. The point on the illuminating surface farthest from the median longitudinal plane of trailer shall be not more than 400 mm from the extreme outer edge of the vehicle. The distance between the inner edge of the two illuminating surface shall be not less than 600 mm. This distance may be reduced to 400 mm, where the overall width of the trailer is less than 1300 mm. The height of tail lights above the ground shall be not less than 350 mm and not more than 1600 mm.	Not provided	Does not conform
9.3	At least two amber flashing reversing lamps (warning lamps) conforming to IS 4060 or IS 13135 as symmetrically mounted and as widely spaced laterally as practicable, visible from both front and rear, mounted at least 1000 mm height but not more than 1500 mm. Lamps shall flash in unison at a rate of 60 to 120 flashes per minute.	Not provided	Does not conform
9.4	Every trailer shall be fitted with two turn indicators (Direction indicators) lamps on the rear side. The directional indicator shall be of amber colour and shall flash in unison at a rate of 60 to 120 flashes per minute. The light emitted by lamps when in operation shall be clearly visible from both front and rear of the vehicle. The direction indicator shall be so designed and fitted	Not provided	Does not conform

	that the tractor operator is aware that it is operating correctly. Illuminated area of each direction indicator shall not be less than 2250 mm ² .		
9.4.1	The rear amber flashing warning lamps (see 9.3) may be used as the turn indicators.	Not provided	Does not conform
9.5	Two brake operated stop light shall be provided at the rear of the trailer which emit red light intended to give warning of the slowing down or stopping of the vehicle, The stop lights may be provided as a part of tail lamps (see 9.2)	Not provided	Does not conform
9.6	A slow moving vehicle emblem conforming to 7 of IS 12239 (Part 2) shall be provided on the rear side of the trailer.	Not provided	Does not conform
10	OTHER REQUIREMENTS		
10.1	The semi-trailer shall be provided with suitable arrangement in the front for keeping the trailer in a leveled position when detached from the towing tractor.	Parking stand is provided	Conforms
10.2	All the parts requiring lubrication shall be provided with suitable arrangement which should be easily accessible and indicated with symbols as per IS 6283 (Part 1)	Lubrication arrangement provided	Conforms
		Not indicated with symbols	Does not conform
10.3	A suitable unobstructed location shall be made available on the trailer chassis for fixing a lift jack for carrying out necessary repairs to the trailers.	Not provided	Does not conform
10.4	In case of tipping type trailer, provisions shall be made for tilting the platform without disturbing the trailer.	Not provided	Does not conform
10.4.1	Single telescopic tipping cylinder shall meet the requirements specified in IS 12371.	Not meeting in full	Does not conform
10.5	When the trailer is loaded uniformly with 25 percent additional pay load and operated at an average speed of 25	Run satisfactory, No breakage/Deformation occurred	Conforms

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	to 30 kmph for 3 hours. It shall not show any sign of breakage of deformation in any part. This test shall be conducted on metalled road.		
11	WORKMANSHIP AND FINISH		
11.1	The sharpness of the edges and corners shall be removed.	No sharp edges observed	Conforms
11.2	Castings and forgings shall be free from blow holes, cracks and other visual defects	Satisfactory	Conforms
11.3	Welding shall not be porous. As far as possible, it should be done in accordance with IS 816.	Satisfactory	Conforms
11.4	All wooden and metal surfaces shall be covered with a coat of suitable preservative. The metal parts should be de-rusted, treated with anti-corrosive material and an appropriate primer painting	Coated with suitable preservative/painting	Conforms
11.5	No trailer should be painted in olive green colour except these belonging to Defence Department.	Indication plate is provided	Conforms
12.0	Marking		
12.1	The trailer shall be marked with the following information on identification plate which shall be welded or riveted to the body:	Provided	Conforms
	a) Manufacturer's name and registered trademark, if any;	Provided	Conforms
	b) Unladen mass	Provided	Conforms
	c) Gross load;	Provided	Conforms
	d) T-sign at the rear (see IS 9942).	Not Marked	Does not conform

**REQUIREMENT OF AXLE ASSEMBLY
(As per clause 8.7, Annex A of IS 8213:2000)**



Clause	Specified requirements as per IS 8213:2000	As observed	Conformity to IS
A-2	CLASSIFICATION		
A-2.1	For the purpose of this standard, the axle assembly shall be of the following two classes:		
	a) Class A - The axle assembly of load carrying capacity up to 3 tonnes. b) Class B - The axle assembly of load carrying capacity up to 5 tonnes.	Class B	Conforms
A-3	DIMENSIONAL REQUIREMENTS		
A-3.1	The dimensions of various components of the axle assembly shall be as given in Co1-3 and 4 of Table 2. The applicable standards for the components are given in Co1-5 of Table 2 for guidance.	---	---
	The axle assembly shall have wheel track of 1500 mm or 1700 mm.	1500	Conforms

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Dimensions of Various Components of Axle Assembly:

Sl. No.	Component	Dimensions		As observed
		Class A	Class B	
1.	Axle shaft size, (mm)	63 square or 80 round	75 square or 80 round	75.38 square
2.	Outer bearing, bore size diameter, (mm)	45	45	96.97
3.	Inner bearing, bore size diameter, (mm)	55	55	112.17
4.	Castle nut, nominal size	M 42x1.5	M 42x1.5	81.22x17.12
5.	Split pin for nut, nominal diameter, (mm)	8	8	6.93
6.	Washer for nut, nominal size, (mm)	43/45	43/45	102.21x1.23
7.	Roundhead screw			
	a) Nominal size	M 6x1	M 6x1	18.85xØ6.11
	b) Length, (mm)	12	12	23.66
	c) Number	3	3	02
8.	Wheel stud:			
	a) Nominal size	M 16x1.5	M 16x1.5	70.80x1.5
	b) Pitch circle diameter, (mm)	165	185	20.12
	c) Number	5	6	8
9.	Hub flange :			
	a) Thickness, (mm)	20	25	21.95
	b) Diameter, (mm)	210	230	124.17
10.	Brake drum:			
	a) Diameter, (mm)	254	254	-
	b) Nominal width, (mm)	50	50	-

Clause	Specified requirements as per IS 8213:2000	As observed	Conformity to IS
A-4	OTHER REQUIREMENTS		
A-4.1	The dust cover shall be fitted with the help of three round head screws and spring washers.	02 Nos. hexagonal bolts used	Does not Conforms
A-4.2	Oil seals or grease retainers shall be provided to make the axle assembly leak and dust proof. Oil seals should conform to IS 5129.	Satisfactory	Conforms

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A-4.3	The hub shall be fully packed with multi-purpose grease between the bearings.	Provided	Conforms
A-5	DESIGNATION		
A-5.1	An axle assembly shall be designated by its class and wheel track.	--	--
A-5.1.1	Example 1		
	An axle assembly of Class A having wheel track of 1500 mm shall be designated as: Axle A 1500	---	----
A-5.1.2	An axle assembly of Class B having wheel of 1700 mm shall be designated as: Axle B 1700	Class-A, 1500	Does not conform
A-6	WORKMANSHIP AND FINISH		
A-6.1	The castings shall be free from blowholes, pits, burrs and other visual defects	Satisfactory	Conforms
A-6.2	The sharp edges shall be removed.	Satisfactory	Conforms
A-6.3	A protective coating shall be provided.	Satisfactory	Conforms

6. HAULAGE PERFORMANCE TEST

Type of trailer : Two wheel

Date of test : 07.06.2022 and 08.06.2022

Type of track : Tar macadam, level

Mass of trailer, (tones) : 1.62

Gross mass of trailer, (tones) : 6.62

Height of trailer hitch above ground level, (mm) : 480

Gear used during test : H-3 & H-4

Average travel speed, (kmph) : 25.85 to 26.31

Average fuel consumption:

- (l/h) : 4.71 o 4.89

- (cc/km/ton) : 30.50 to 37.14

Average distance traveled per liter of fuel consumed,(km) : 5.39 to 6.58

General observations:

Maneuverability of Tractor-trailer Combination : Satisfactory

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7. TRAILER PLATFORM LIFTING TEST

Date of test : 10.06.2022
 Operating conditions : Trailer parked on level ground
 Ambient temperature, (°C) : 23 to 29
 Relative humidity, (%) : 23 to 27
 Hydraulic oil temperature before start of test, (°C) : 55

Sl. No.	No. of cycles	Temperature of hydraulic fluid, (°C)
1	100	55
2	200	56
3	300	57
4	400	58
5	500	59
6	600	59
7	700	62
8	800	64
9	900	65
10	1000	67
Leakage of hydraulic fluid from any part of hydraulic system	:	None
Working of hydraulic system	:	Satisfactory

8. LOAD MAINTENANCE TEST (Trailer bucket in fully raised position)

Date of test : 09.06.2022
 Operating conditions : Trailer parked on level ground
 Hydraulic oil temperature before start of test, (°C) : 41
 Initial height from ground level, (mm) : 3360

Elapsed time (Min.)	Cumulative drop in height of unloading box, (mm)
5	0.0
10	1.0
15	3.0
20	6.0
25	6.0
30	7.0
Leakage of hydraulic fluid from any part of hydraulic system	: None
Working of hydraulic system	: Satisfactory

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9. EASE OF OPERATION & ADJUSTMENTS

No difficulty was observed during the operation and adjustment of Trailer.

10. DEFECTS, BREAKDOWNS AND REPAIRS

No defect/breakdown and repair was occurred during entire period of testing.

11. Critical Technical Specification

S.N	Parameters	Specification	Observation	Remarks
1	Class of vehicles	2 wheel trailer up to 5 T	2 wheel trailer 5 T capacity	Conforms
2	Type of body – solo/solo with pillion Hatches back /sedan /saloon /estate	One/three side tipping	One side tipping	Conforms
3	Type of vehicle	R 1-R 2 (R1 for GVW up to 3T/ R2 for GVW up to 5T)	R2	Conforms
4	ULW (unladed weight)	Provided	162	Conforms
5	Sheet metal	3 mm side and 5 mm base MS sheet	3.12 mm/5.04mm	Conforms
6	GVM (gross vehicle weight) or RLW (registered laden weight) as certified by the manufacturer	-kgs	6620	Conforms
7.	Number , description , size and ply rating of tyre as declared by the manufacturer	Provided	9.0-16.0 (18 PR)	Conforms
8	Front axle	6.00x16, 6PR (min)/10.00x20, 16PR tube type	Not applicable	--

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9	Overall length, mm	2000 to 4100 to be checked	3295	Does not conform
10	Overall width, mm	900 (min) to be checked	1150	Conforms
11	Overall height, mm	600 (min)	2000	Conforms
12	Min, ground clearance	-	400	Conforms
13	Marking /labeling of machine	The labeling plate should be riveted on the body of machine having name and address of manufacturer, country of origin, make, model, month & year of manufacturer, serial number, size, required size of prime mover (kW), weight (Kg)	Provided as per Para 4.11 but not meeting the requirement of IS	Does not conform

12. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATION

- 12.1 Dimensional requirements of single axle (semitrailer) Conforms to IS 8213:2020.
- 12.2 To protect from mud and soil the rubber flaps are provided at rear end of the wheels.
- 12.3 The lighting arrangement of trailer is not provided as per IS 8213:2020. This should be looked into for corrective action.
- 12.4 The specification of trailer does not conform in full, to the IS 8213:2020. This should be looked into for corrective action.
- 12.5 The dimensions of hydraulic tipping cylinder do not meet, in full to the requirement of IS 12371:2019. This should be taken care for corrective action
- 12.6 The dimensions of ring type hitch does not meet, in full, the requirement of IS 11270:1980 (Reaffirmed 2019). This should be taken care for corrective action.
- 12.7 The dimensions of various components of axle assembly do not conform, in full, the requirement of IS 8213:2000. This should be looked into for corrective action.

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- 12.8 The Slow moving emblem & T sign are not provided. This may be provided
- 12.9 An axle assemble is not designed by its class and wheel track. This should be looked into corrective action.

12.10 Adequacy of literature:

Service manual parts catalogue of trailer were provided operation manual and parts catalogue be brought out in Hindi and other regional languages in **booklet form** as per IS 8132: 1999 (Reaffirmed 2019) for the sake of user & technical personnel.

TESTING AUTHORITY:

D.C. MOULI AGRICULTURAL ENGINEER	
P.KAMALABAI SENIOR AGRICULTURAL ENGINEER	
K.K. NAGLE DIRECTOR	

13. Applicants Comments

Para No.	Our Ref. No.	Applicants comments
13.1	12.3	We will correct it as per the IS
13.2	12.4	We will provide the literature as per IS 8132:1999 (Reaffirmed 2019)