

SAECK)

व्यावसायिक परीक्षण रिपोर्ट (वैरिएंट)
COMMERCIAL TEST REPORT (Variant)

संख्या / No. : T-1109/1635/2017
माह / Month : September, 2017



CAPTAIN 250 DI 4WD + TRACTOR



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

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T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

Type of Test : COMMERCIAL (Variant)

Test code/Procedure : IS:5994-1998 (Reaffirmed in 2009) and IS: 12207-2014.

Period of Test : May,2017 to September,2017

Test Report No. : T-1109/1635 /2017

Month/Year : September, 2017

- i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
- ii) The data given in this report pertain to the particular machine submitted by the applicant for tests.
- 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, Central Farm Machinery Training and Testing Institute, Budni (M.P.)
- v) This is a test report on variant model "CAPTAIN 250 DI 4WD + Tractor" tractor and therefore, should be read in conjunction with the Test Report of base model i.e. "CAPTAIN 250 DI Tractor" bearing report No. T- 1081/1606/2017 (April, 2017).

SELECTED CONVERSIONS

Sl. No	Units	Conversion Factor	ABBREVIATIONS	
1.	Force:		Apa	As per applicant
	1 kgf	9.80665 N	TDC	Top Dead Centre
		2.20462 lbf	IS	Indian Standard
2.	Power:		LHS/RHS	Left Hand Side/ Right Hand Side
	1 hp	1.01387metric hp (Ps)	Hg	Mercury
		745.7 W	Temp.	Temperature
	1 Ps	735.5 W	N.R.	Not recorded
	1 kW	1.35962 Ps	Rpm	Revolutions per minute
3.	Pressure:		O.D/I.D	Outer diameter/ Inner diameter
	1 psi	6.895 kPa	N.A.	Not available/ Not applicable
	1 kgf/cm ²	98.067 kPa = 735.56 mm of Hg	PTO	Power take-off
	1 bar	100 kPa = 10 N/cm ²	R.H.	Relative Humidity
	1 mm of Hg	1.3332 m-bar		

CONTENTS

S. No.	Particulars of test	PAGE
1.	Scope of test	05
2.	Fuel & Lubricants	06
3.	Essential Test	06
	3.1 Specifications	06
	3.2 Nominal speed	18
	3.3 PTO Performance	19
4.	Other applicable tests	19
	4.1 Drawbar performance test	19
	4.2 Centre of gravity of test	24
	4.3 Turning ability test	24
	4.4 Noise measurement	24
5.	Adjustments, Defects, Breakdowns & Repairs	25
6.	Comparison Between Base Model and Variant Model	25
7.	Summary of Observations, Comments & Recommendations	28
8.	Citizen Charter	31
9.	Applicant comment's	31
	Annexure – I	32
	Annexure – II	32

T-1109/1635/2017 **CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)**

Manufacturer : M/s. Captain Tractors Pvt. Ltd.,
Padavala Road, Veraval (Shapar),
Tal : Kotda Sanagani,
Distt. : Rajkot (Gujarat)

Test requested by : The manufacturer
Selected for test by : Applicant
Place of running-in : At applicant's works

Duration of said running-in, (h):
- Engine : 18
- Transmission : 08

Method of Selection : The tractor was submitted directly by the applicant for test. Hence method of selection is not known.

1. SCOPE OF TEST

The "CAPTAIN 250 DI" tractor had undergone Initial Commercial Test at this Institute and test report No. T-1081/1606/2017 was released in April, 2017. Now the applicant has submitted an application vide letter No. Nil, dated on 07.02.2017 for testing of "CAPTAIN 250 DI 4WD+" tractor as a variant of "CAPTAIN 250 DI" tractor.

The applicant having enclosed a list of following differences in the technical specifications "CAPTAIN 250 DI" and "CAPTAIN 250 DI 4WD +" and requested to test the "CAPTAIN 250 DI 4WD +" tractor as a variant of "CAPTAIN 250 DI" tractor:-

The major features of Base model and Variant model are listed below:

S. No.	Parameters	Base Model Test Report No. T-1081/1606/2017(April)	Variant Model
1.	Make & Model of tractor	CAPTAIN & 250 DI	CAPTAIN & 250 DI 4WD+
2.	Type of wheel drive	2 WD	4WD
3.	Front axle	Dead front axle (2WD) (Refer Annexure – I)	Live front axle (4WD) (Refer Annexure – I)
4.	Reduction through crown wheel & pinion	4.27:1 (47/11T)	5.375:1(43/8T)
5.	Reduction through final drive	5.00 : 1 (70/14T)	4.6: 1 (89/15T)
6.	Front tyre size & ply rating	Pneumatic, ribbed 5.20 x14, 8PR	Pneumatic, traction, 8.00x12, 4 PR
7.	Make & size of front wheel rims	SSWL & 3.5 J x14	CWPL & 5J x12
8.	Make & size of rear wheel rims	CWPL 5.5 F x 18	CWPL W7 x 20
9.	Mass of tractor [front/rear/total] (kgf)	380/530/910	425/565/990

Subsequent to the examination of the case in the light of Indian Standard: 12207-2014, the following tests were considered to be carried out:

- Specification checking
- Nominal speed test
- Two hour maximum PTO power performance test, under normal ambient condition
- Drawbar performance test
- Centre of gravity of test
- Turning ability test
- Noise Measurement



T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 g/cc at 15°C was used.

2.2 Lubricants:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine & air cleaner oil	SAE 15W40	SAE 15W40
2.	Main gear box and high-low gear box assembly, Rear differential unit, rear axle, rear final drive & hydraulic system	SAE 90	Oil originally filled in the tractor was not changed
3.	Front Differential unit, Front axle and front final drive	SAE 90	Not applicable
4.	Steering gear box	SAE 90	-do-
5.	Grease	Servo JML MP-3	Servo Grease MP

3. ESSENTIAL TESTS

3.1 SPECIFICATIONS

3.1.1 Tractor:		<u>Base model</u>	<u>Variant model</u>
Make	:	Captain	Captain
Model	:	250 DI	250 DI 4WD +
Type	:	Four wheeled, rear wheel drive, agricultural tractor.	Four wheel driven, Agricultural Tractor
Year of manufacture	:	2016	2017
Chassis serial number	:	D216010513	D117021304
Country of origin	:	INDIA	INDIA
3.1.2 Engine:			
Make	:	Simpson & Co. Ltd. Chennai	Simpson & Co. Ltd. Chennai
Model	:	T III A SC213-F20	T III A SC213-F20
Type	:	Four stroke, water cooled, direct injection, diesel engine	naturally aspirated,
Serial number	:	SC21304397	SC21307007
Country of origin	:	Simpson & Co. Ltd. Chennai	Simpson & Co. Ltd.
Engine speed (rpm), (Manufacturer's recommended production setting):			
- Maximum speed at no load	:	2300 to 2400	2300 to 2400
- Low idle speed	:	700 to 800	700 to 800
- Speed at maximum torque	:	1200 to 1300	1200 to 1300
Rated speed, (rpm):			
- For PTO use	:	2200	2200
- For drawbar use	:	2200	2200
3.1.3 Cylinder & Cylinder Head:			
Number	:	Two	Two
Disposition	:	Vertical, Inline	Vertical, Inline
Bore/stroke, (mm)	:	95 / 91	95 / 91
Capacity as specified by the applicant, (cc)	:	1290	1290
Compression ratio	:	18.3 ± (0.3) : 1	18.3 ± 0.3 : 1 (apa)



T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

	<u>Base model</u>	<u>Variant model</u>
Type of cylinder head	: Integral	Integral
Type of cylinder liners	: Wet, Non-replaceable	Wet, Non-replaceable
Type of combustion chamber	: Direct combustion, re-entrant cavity on piston crown.	Direct combustion, re-entrant cavity on piston crown.
Arrangement of valves	: Overhead, Inline	Overhead, Inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	: 0.25/0.25	0.25/0.25
- Exhaust valve, (mm)	: 0.30/0.30	0.30/0.30
3.1.4 Fuel System:		
Type of fuel feed system	: Gravity and force feed	
3.1.4.1 Fuel tank:		
Capacity, (l)	: 20.2	19.7
Location	: Above clutch housing	
Provision for draining of sediments/ water	: Not provided	Not provided
Material of fuel tank	: Sheet metal	Sheet metal
3.1.4.2 Water Separator:	: Not provided	Not provided
3.1.4.3 Fuel feed pump:		
Make	: Bosch, India	
Type	: Plunger	
Model/Group combination No.	: FPI/KS22AD62, 9 440 030 029	FP/KS22AD105, F002A50040
Provision of sediment bowl	: Provided	Provided
Method of drive	: Through camshaft of fuel injection pump	
Location	: Integrated with fuel injection pump	
3.1.4.4 Fuel filters:		
Make	: Bosch, India	Bosch, India
Model/Group combination No.	: F002 H20 151	F002 H20 151
Number	: Two	Two
Type of elements:		
-Primary	: Cloth	Cloth
-Secondary	: Paper	Paper
Capacity of final stage filter, (l)	: 0.38	0.41
3.1.4.5 Fuel Injection pump:		
Make	: Bosch, India	
Model/Group combination No.	: F002 A4Z 001	
Type	: Inline, Plunger	
Serial number	: 51935045	65438678
Method of drive	: Through timing gears.	
3.1.4.6 Fuel injectors:		
Make	: Bosch, India	Bosch, India
Model	: F002 C8 0015 453	F002 C8 0015 653
Nozzle /holder number	: DSLA 144 P5624	DSLA 144 P5624, 653 210 062
Type	: Multi hole (Five holes)	
Manufacturer's production pressure setting, (MPa)	: 26 ± 0.8	
Injection timing	: 10 ± 1° before TDC	

		<u>Base model</u>	<u>Variant model</u>
3.1.4.7 Governor:			
Make	:	Bosch, India	
Model/Group combination No.	:	RSV 425...1100A2C1762R	
Type	:	Mechanical, centrifugal variable speed	
Rated engine speed, (rpm)	:	2200	
Governed range of engine speed, (rpm)	:	700 to 2400	
3.1.5 Air intake system:			
3.1.5.1 Pre-cleaner:			
Make	:	Not available	Not available
Type	:	Centrifugal with transparent dust collector	
Location	:	Above main air cleaner Inlet tube on LHS of Engine.	
3.1.5.2 Air cleaner:			
Make	:	Not available	
Type	:	Oil bath	Oil bath
Location	:	On LHS of engine, outside the bonnet	
Oil capacity (l)	:	0.30	0.31
Range of suction pressure at maximum power (kPa)	:	1.9 to 2.1	1.9 to 2.2
Oil change period/ Maintenance schedule	:	After every 50 hours of operation in normal working condition.	
3.1.6 Exhaust System:			
Type of silencer	:	Updraft, Cylindrical	Updraft, Cylindrical
Position of silencer outlet with respect to SIP, (mm):			
- Vertical	:	550	640
- Longitudinal	:	1055	1055
- Lateral	:	250 (on RHS)	245 (on RHS)
Range of exhaust gas pressure at maximum power (kPa)	:	9.2 to 13.0	11.2 to 13.6
Provision of spark arresting device	:	None	None
Provision against entry of rain water	:	A bend is provided at the top of silencer	
3.1.7 Lubricating system:			
Type	:	Forced feed cum splash	
Oil sump capacity, (l)	:	3.80	3.6
Total lub oil capacity, (l)	:	4.10	4.0
Oil change period	:	First change after 50 hours of operation and subsequently after every 250 hours of operation.	
Cooling device, (if any)	:	None	None
Filters:			
Type	:	Full flow, spin on, throw away type	
Number	:	One	One
Pump:			
Type	:	Rotary lobe type	
Method of drive	:	Through timing gear.	
Minimum permissible pressure, (kPa)	:	147 (apa)	147 (apa)

	<u>Base model</u>	<u>Variant model</u>
3.1.8 Cooling system:		
Type	: Forced circulation of coolant & water	
Name or brand name of coolant	: Castrol (apa)	
Coolant water ratio	: 1:1	
Details of Pump	: Centrifugal, semi open impeller of 66.58 mm diameter, having six vanes and driven through crankshaft pulley by a cogged V-belt in common with alternator.	
Diameter of fan, (mm)	: Suction type having six polypropylene blades of 292 mm diameter, and mounted on water pump shaft.	
Means of temperature control	: Thermostat	
Bare radiator capacity, (l)	: 2.12	2.17
Total coolant capacity, (l)	: 4.60	4.66
Radiator cap pressure, (kPa)	: 88	88
3.1.9 Starting System:		
Type	: 12 V DC, Electrical	12 V DC, Electrical
Aid for cold starting	: None	None
Any other device provided for easy starting	: None	None
3.1.10 Electrical System:		
3.1.10.1 Battery:		
Make & model	: Exide,65D 26RMF	Exide & MF570R
Type	: 12V, Lead acid	12 V, Lead acid
Capacity and rating	: 65 Ah at 20 hours discharge rating.	70 Ah at 20 hours discharge rating.
Location	: On RHS of clutch housing in a separate box.	
3.1.10.2 Starter:		
Make	: Lucas TVS	Lucas TVS
Model	: M70 GRS	M70 GRS
Type	: Pre-engaging, solenoid operated	
Power rating	: 12V, 1.2 kW	12V, 1.2 kW
Serial number	: Not provided	26024566A
3.1.10.3 Generator:		
Make	: Autolek	Autolek
Model	: ALM 4005	ALM 4005
Type	: Alternator	Alternator
Output rating	: 12V, 35 Amp	12V, 35 Amp
Method of drive	: Through crankshaft pulley by a cogged V-belt.	
3.1.10.4 Voltage regulator	: In-built in alternator	



T-1109/1635/2017	CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)
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3.1.11.4 Details of lights:

Description	No. & capacity of bulbs	Height of the centre of beam above ground level, (mm)		Size of beam, (mm)		Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)	
		Base model	Variant model	Base model	Variant model	Base model	Variant model
1	2	3	4	5	6	7	8
Front Lights:							
- Head lights	2, 12V, 35/35W	935	975	140 x 90	138 x 90	417	425
- Parking lights	2, 12V, 5W	915	915	40 x 60	45 x 60	165	185
- Turn Indicators-cum-Hazard lights	2, 12V, 21W	915	915	75 x 60	75 x 60	90	130
Rear lights:							
-Tail light-cum-brake light	2, 12V, 21/5W	885	935	40 x 65	40 x 65	162	170
- Turn Indicators-cum-Hazard lights	2, 12V, 21W	885	935	40 x 65	40 x 65	80	90
- Plough light (on RHS mudguard)	1, 12V, 55W	1045	1085	35 x 65	110 ϕ	210	215
- Reflectors (Red)	2	885	935	40 x 65	35 x 55	120	130
-Registration plate Light (RHS)	Part of rear combination assembly			Part of rear combination assembly			

3.1.11 Instrument panel details:

	<u>Base model</u>	<u>Variant model</u>
i) Engine speed-cum-cumulative run hour meter (0 – 30 x 100 rpm).	Provided	Provided
ii) Fuel level gauge (with colour zones)	Provided	Provided
iii) Water temperature gauge (40 -120 °C)	Provided	Provided
iv) Battery charging warning indicator light.	Provided	Provided
v) Main switch (key turn type).	Provided	Provided
vi) Light switch (rotary type).	Provided	Provided
vii) Turn indicator-cum-hazard light tell-tale.	Provided	Provided
viii) Lubricant oil pressure indicator light.	Provided	Provided
ix) Hazard light push button.	Provided	Provided
x) Two way switch for Turn indicators.	Provided	Provided
xi) Head light long beam indicator light.	Provided	Provided
xii) Mobile charging socket	Provided	Provided
xiii) Rear view mirror.	Provided	Provided
xiv) Fuel shut-off knob.	Provided	Provided
xv) Steering control wheel.	Provided	Provided
xvi) Hand accelerator lever.	Provided	Provided

3.1.12 Transmission System:

3.1.12.1 Clutch:	<u>Base model</u>	<u>Variant model</u>
Make	: Luk	
Type	: Single, Dry friction plate, diaphragm type	
No. of friction plate(s)	: One	
Size, (mm):OD/ID	: 212 ϕ / 141 ϕ	
Method of operation:	: By pressing the clutch pedal, provided on LHS.	

		<u>Base model</u>	<u>Variant model</u>
3.1.12.2	Gear box:		
	Make	: Captain (apa)	Captain (apa)
	Type	: Mechanical, Combination of constant mesh and synchromesh gears.	
	No. of speeds:		
	- Forward	: 08	08
	- Reverse	: 02	02
	Location of main gear shifting levers	: In the centre, in-front of operator's seat	
	Location of high-low gear shifting levers	: On LHS, in-front of operator's seat	
	<u>Gear shifting pattern of base model</u>		
	<u>Gear shifting pattern of variant model</u>		
		<u>4 WD / 2 WD Selection Lever</u>	<u>Main gear shifting lever</u> <u>Range shifting lever</u>
	Oil capacity (l)	: 3.50	3.50
	Oil changing period	: Every 500 hours of operation.	
3.1.12.3	Range of nominal Speed (Kmph):		
	- Forward	: 3.02 to 23.03	2.85 to 21.59
	- Reverse	: 2.27 to 4.33	2.14 to 4.07
3.1.12.4	Rear Differential Unit:		
	Type	: Crown wheel and pinion with differential unit, accommodated inside differential housing.	
	Reduction through crown wheel & bevel pinion	: 4.273:1 (47/11T)	5.375:1(43/8T)
	Oil capacity of final drive, (l)	: 16.5 (In common with final drive & hydraulic system)	17.3 (In common with final drive & hydraulic system)
	Oil capacity of final drive (l)	: Every 500 hours of operation.	
	Differential lock:	Not provided	Not provided
3.1.12.5	Rear axle & final drive:		
	Type	: Bull and pinion gear reduction unit, accommodated outside differential housing on both sides.	
	Reduction through final drive	: 5.00 : 1 (70/14T)	4.6: 1 (69/15T)



T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

		<u>Base model</u>	<u>Variant model</u>
3.1.12.6	Front Differential Unit:		
	Type :	Not applicable	Crown wheel and pinion with differential unit, accommodated inside differential housing.
	Reduction through crown wheel & pinion :	Not applicable	4.777 :1 (43/9T)
	Differential lock:	Not provided	Not provided
3.1.12.7	Front axle and final drive:		
	Type :	Not applicable	Bevel pinion reduction
	Reduction through front final drive :	--	1.933 :1 (29/15T)
	Oil capacity of final drive, (l) :	--	2.50 (Common with front differential unit)
	Oil capacity of final drive (l) :	--	Every 500 hours of operation.
3.1.13	Power lift (Hydraulic System):		
	- Make :	Captain	
	- Type :	Open centre, Live, ADDC	
	- No. and type of cylinder :	One, single acting	
	-Type of linkage lock for transport :	Hydraulic, mode selector valve knob in fully closed position act as a transport lock.	
3.1.13.1	Hydraulic pump:		
	- Make :	Not available	Dowty (apa)
	- Type :	External Gear	External Gear
	- Location :	Mounted on in front of engine.	
	-Method of drive :	Driven through crankshaft pulley	
	No. & Type of filter :	Two	
		i)	Fine wire mesh strainer at suction line, inside the gearbox.
		ii)	Full flow spin on throw away type
	Hydraulic oil capacity, (l) :	16.5 (In common with differential & final drive)	17.3 (In common with differential & final drive)
	Oil change period :	Every 500 hours of operation.	
	Provision for external tapping :	Provided	
	Details of control levers :		
		i)	Position control lever (Black)
		ii)	Draft control lever (Red)
		iii)	Mode selection valve knob at distributor
	Method of draft sensing :	Through top link	



T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

3.1.13.2 Three point linkage:

Sl. No.	Observations	As per IS: 4468- (Part-2) -1993 (Cat. 1N Narrow Hitch), (mm)	As measured (mm)		Remarks in case of variant model
			Base model	Variant model	
1	2	3	4	5	6
I.	Upper hitch points:				
	a) Dia of hitch pin hole	19.30 to 19.51	20.54	20.53	Does not conform
	b) Width of ball	44.0 (max.)	37.50	37.97	Conforms
II.	Lower hitch points:				
	a) Dia of hitch pin hole	22.40 to 22.73	22.54	22.58	Conforms
	b) Width of ball	34.8 to 35.0	35.00	34.88	-do-
III.	Lateral distance from lower hitch point to centre line of tractor.	218	218	218	-do-
IV.	Lateral movement of lower hitch points	50 (min)	70	115	-do-
V.	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position)	300 to 375	345	345	-do-
VI.	Transport height	600 (min)	695	690	-do-
VII.	Power range (Without force)	420 (min)	435	430	-do-
VIII.	Leveling adjustment	75 (min)	250	230	Conforms
IX.	Lower hitch point tyre clearance	100 (min)	255	150	-do-
X.	Lower hitch point height	200 (max)	200	200	-do-

3.1.13.4 Drawbar:

3.1.13.4.1 Linkage Drawbar [Refer Fig. 1(a)]:

Notation	As per IS: 12953-1990, & IS: 4468 (Pt-2)- 1993, (mm)	As measured, (mm)		Remarks in case of variant model
		Base model	Variant model	
A	400 ± 1.5	400	400	Conforms to Cat 1N
B	75 (min) / 75 (min)	80.00	80	Conforms to Cat 1N
C	30 (min) / 30 (min)	32.10	31.8	Conforms to Cat 1N
D \varnothing	21.79 to 22.0	22.00	21.84	Conforms to Cat 1N
E	39.0 (min)	39.00	39.8	Conforms to Cat 1N
F \varnothing	12.0 (min)	12.00	12.1	Conforms to Cat 1N
G	15.0 (min) / 15.0 (min)	15.00	15.6	Conforms to Cat 1N
H \varnothing	25 ± 1 / 25 ± 1	25.00	24.8	Conforms to Cat 1N
J	80 ± 1.5 / 80 ± 1.5	80.00	80	Conforms to Cat 1N
No. of holes	05	05	05	Conforms to Cat 1N

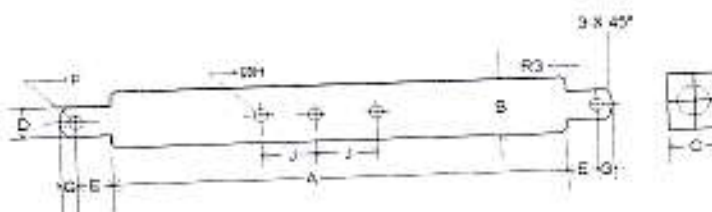


Fig. 1(a): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

3.1.13.4.2	Swinging drawbar	: <u>Base model</u> Not provided	<u>Variant model</u> Not provided
3.1.14	Power take-off shaft:	: Type-I, Not independent	
	Type	: By a hand lever, provided on RHS and in front of operator's seat.	
	Method of engaging	: One One	
	No. of shaft(s)	: One One	
	Distance behind rear axle, (mm)	: 280	285
	PTO speed corresponding to rated engine speed (rpm)	: PTO speed @ rated engine speed	
	Gear No.	BASE MODEL	VARIANT MODEL
	L1 and H1	: 551	551
	L2 and H2	: 928	928
	L3 and H3	: 1493	1493
	L4 and H4	: 2200	2200
	LR and HR	: 414	414
	Engine to PTO speed ratio	Base model	Variant model
	Gear No.	: Engine to PTO speed ratio	
	L1 and H1	: 3.993 :1	3.993 :1
	L2 and H2	: 2.371 :1	2.371 :1
	L3 and H3	: 1.474:1	1.474:1
	L4 and H4	: 1 :1	1 :1
	LR and HR	: 5.314 :1	5.314 :1
	Whether PTO Shaft is capable of transmitting the full power of engine	: Yes	

3.1.14.2 Specifications of Power Take-Off Shaft:				
Specification	As per IS:4931-1995	As observed		Remarks in case of variant model
	(Type-I)	Base model	Variant model	
	2	3	4	5
Nominal speed (rpm)	540 ± 10	540 (corresponds to 2156 rpm of engine)	540 (corresponds to 2156 rpm of engine)	Conforms
No. of splines	6	6	6	Conforms
Direction of rotation	Clockwise	Clockwise	Clockwise	Conforms
Location	The position of the centre of the end of PTO shaft shall be within 50 mm to right or left of the centre line of the tractor.	Centrally located	Centrally located	Conforms

1	2	3	4	5
Dimensions (mm) (See Fig. 2):				
D \varnothing	34.79 \pm 0.06	34.84	34.76	Conforms
d \varnothing	28.91 \pm 0.05	28.65	28.91	Conforms
B \varnothing	29.4 \pm 0.1	29.30	29.50	Conforms
A \varnothing (optional)	8.3 \pm 0.1	8.30	8.2	Conforms
W	8.69-0.09 -0.16	8.53	8.60	Conforms
A	7	7	7	Conforms
b(optional)	25 \pm 0.5	25.0	25	Conforms
C	38	38	38	Conforms
X	30 $^{\circ}$	30 $^{\circ}$	30 $^{\circ}$	Conforms
B	76 (min)	82	82	Conforms
h*	450 to 675	440	465	Conforms

*350 mm tractors having track width less than 1150 mm

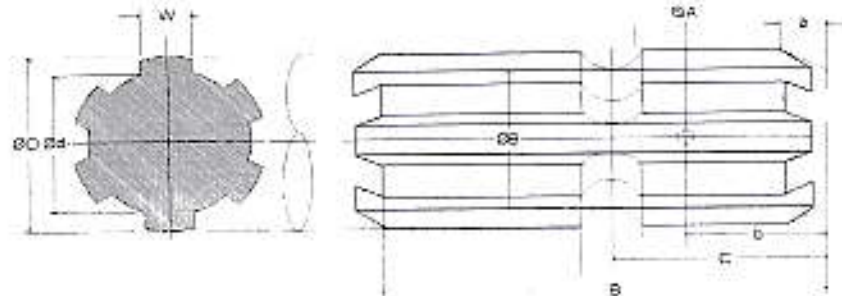


Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

		<u>Base model</u>	<u>Variant model</u>
3.1.14.3	Power Take-Off Shaft Shield	: Not provided	: Not provided
3.1.15	Towing hitch:		
3.1.15.1	Front:	: Not provided	: Not provided
3.1.15.2	Rear:		
	Type	: Clevis	: Clevis
	Location	: At the rear of differential housing	: At the rear of differential housing
	Height above ground level, (mm)	: 330 (Fixed)	: 350 (Fixed)
	- Type of adjustment	: None	: None
	Distance of hitch point,(mm):		
	- From rear axle centre	: 330	: 325
	- From power take-off shaft end	: 50	: 40
	Dia of pin hole, (mm)	: 27.75	: 27.9
	Width of clevis, (mm)	: 76.40	: 78.0
3.1.16	Steering:		
	Make	: Rane	: Rane
	Type	: Mechanical, recirculation ball & nut type having single drop arm.	: Mechanical, recirculation ball & nut type having single drop arm.
	Location	: Above clutch housing	: Above clutch housing
	Method of operation	: Manual, by steering control wheel	: Manual, by steering control wheel
	Diameter of steering control wheel, (mm)	: 380	: 380
	Steering oil capacity, (l)	: 0.40	: 0.30
	Oil change period	: Every 500 hours of operation.	: Every 500 hours of operation.



T-1109/1635/2017	CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)
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		<u>Base model</u>	<u>Variant model</u>
3.1.17	Brakes:		
3.1.17.1	Service Brake:		
	Make	: Captain (apa)	: Captain (apa)
	Type	: Mechanical, internal expanding shoe & drum.	
	Location	: On rear axle shafts, outside the differential housing	
	Area of liners, (cm ²)	: 82.08(on each wheel side)	
	Material of liners	: Non Asbestos (apa)	
	Method of operation	: Independent / combined pedal operation by right foot.	
3.1.17.2	Parking Brake:		
	Type	: Mechanical arrangement for locking the service brake pedals.	
	Method of operation	: By locking the service brake pedals by a hand lever provided on RHS of operator's seat.	
3.1.18	Wheel Equipment:		
3.1.18.1	Steering Wheel(s):		
	Make	: Speed ways	: MRF Shakti
	Number	: Two	: Two
	Type of tyre	: Pneumatic, ribbed	: Pneumatic, traction
	Size & Ply rating	: 5.20-14 & 8 PR	: 6.00-12 & 4PR
	Maximum permissible loading capacity of each tyre at 210 kPa pressure, (kg)	: 375	: 325
	Recommended inflation pressure, kPa :		
	- for field work	: 216	: 170
	- for transport	: 245	: 200
	Track width, (mm)	: 860 (std.) & 960	: 860 (std.) & 1030
	Method of changing track width	: By reversing the rim	
	Make & size of rim	: SSWL ,3.5J x 14	: CWPL ,5 J x 12
3.1.18.2	Driving wheel:		
	Make	: MRF Shakti	: MRF Shakti
	Number	: Two	: Two
	Type of tyre	: Pneumatic, traction	: Pneumatic, traction
	Size & Ply rating	: 8.00-18 & 4PR	: 8.3-20 & 6 PR
	Maximum permissible loading capacity of each tyre at 160 kPa pressure, (kg)	: 515	: 710
	Recommended inflation pressure, (kPa)		
	- for field work	: 84	: 90
	- for transport	: 157	: 160
	Track width, (mm)	: 830 (std.) , & 950	: 845 (std.) , & 925
	Method of changing track width	: By reversing the wheel discs.	
	Make & size of rim	: CWPL, 5.50 F x 18	: CWPL, W7 x 20
3.1.18.3	Wheel base (mm)	: 1555	: 1540
	Method of changing wheel base, if any	: None	: None
3.1.19	Operator's seat:		
	Make	: Captain (apa)	: Captain (apa)
	Type	: Cushioned	: Cushioned
	Type of suspension	: Two helical springs	: Two helical springs
	Type of dampening	: None	: None



T-1109/1635/2017 **CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)**

Range of adjustment,(mm):		<u>Base model</u>	<u>Variant model</u>
- Vertical (back rest)	:	Nil	Nil
- Lateral	:	Nil	Nil
- Longitudinal	:	± 45	± 25
3.1.20	Provision for safety and comfort of operator:		
3.1.20.1	Conformity with IS:12343-1998: Operator's seat meets the requirements of IS:12343-1998, (Re-affirmed in March, 2009) except the following:		
	<u>Base model</u>		<u>Variant model</u>
	(i) Vertical distance from SIP to centre of steering control wheel & accelerator pedal	(i)	Vertical distance from SIP to centre of steering control wheel.
	(ii) Vertical distance from SIP from foot rest.		
3.1.20.2	Conformity with IS: 6283 (Part-1 & 2)-2006 & 2007(Re-affirmed in March, 2009): Controls and displays are identifiable with symbols as per IS : 6283 (Part 1&2) – 1998, except the following:		
	(i) The symbol for pressurized, open & slowly	(i)	Meets the requirement.
	(ii) Grease lubricant frequency.	(ii)	Grease lubricant frequency.
3.1.20.3	Conformity with IS:8133-1983 (Re-affirmed in March, 2009): Meets the requirements of IS:8133 - 1983 (reaffirmed March, 2009, except the following:		
	(i) Meets the requirements	(i)	The fuel shut off knob does not remain in STOP position without sustained manual effort.
3.1.20.4	Conformity with IS: 12239 (Part-1)-1996 (Re-affirmed in March, 2007): Meets the requirements of IS:12239(Part-1)-1996, except the following:		
	(i) The spark arrester has not been provided in the exhaust system.	(i)	The spark arrester has not been provided in the exhaust system
	(ii) Operator's work place hand holds for easy mounting & dismounting of the operator	(ii)	Operator's work place hand holds for easy mounting & dismounting of the operator
3.1.20.5	Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in March, 2009): Meets the requirements of IS:12239 (Part-2)-1999, except the following:		
	(i) The working clearance around the hand control between draft control lever & mudguard is less than 70 mm	(i)	The working clearance between the position and draft control lever is less than 70 mm
	(ii) Power take off master shield has not been provided.	(ii)	Power take off master shield has not been provided.
	(iii) Provision of differential lock.	(iii)	Provision of differential lock.
1.20.6	Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) : Lighting meets the requirements of IS: 14683 – 1999.		
3.1.21	Mass of tractor Kg):Unballast	<u>Base model</u>	<u>Variant model</u>
	- Front	380	425
	- Rear	530	565
	- Total	910	990
3.1.22	Over all dimensions (mm):		
	- Length	2630	2570
	- Width	1075	1085
	- Height	1700	1740
	Minimum ground clearance	230	260
		(Below transmission housing)	

T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

3.1.23 **Labelling of tractor as per IS: 10273-1987 (Reaffirmed in March, 2009):**
The labelling plate riveted on inner side of LHS midguard, provides the following information.

Name of Manufacturer	:	CAPTAIN TRACTORS PVT LTD. Padavla Road, Veraval (Shapar), Tal: Kotda Sangani, Dist: Rajkot, (Gujarat) INDIA
Make	:	CAPTAIN
Model	:	250 DI 4WD +
Chassis Serial Number	:	D117021304
Engine Serial Number	:	SC21307007
Year of Manufacturer	:	2017
Maximum PTO Power, (kW)	:	14.5
Specific fuel consumption, (g/kWh)	:	259

3.1.24	Number of external lubricating points:	Base Model	Variant model
	- Oiling	Nil	Nil
	- Grease cups	02	Nil
	- Grease nipples	07	07
3.1.25	Colour of tractor:		
	Chassis & engine	Grey	Grey
	Sheet metal:		
	Bonnet & Mudguard	Red	Red
	Rim & disc	Silver	Silver

3.2 NOMINAL SPEED TEST

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel		Nominal speed at rated engine speed when fitted with 8.00-18 size tyres of 395 mm radius index, (kmph)	Nominal speed at rated engine speed when fitted with 8.3-20 size tyres of 420 mm radius index, (kmph)	Variation in nominal speed (%)
		Base model	Variant model	Base model	Variant model	
Forward	L1	108.57	126.53	3.02	2.85	-5.6
	L2	64.39	74.60	5.09	4.78	-6.1
	L3	39.95	46.29	8.20	7.70	-6.1
	L4	27.21	31.51	12.04	11.32	-6.0
	H1	56.89	65.5	5.76	5.43	-5.7
	H2	33.72	39.07	9.72	9.17	-5.7
	H3	20.96	24.26	15.63	14.70	-6.0
	H4	14.23	16.48	23.03	21.59	-6.3
Reverse	RL	144.46	166.98	2.27	2.14	-5.7
	RH	75.74	87.48	4.33	4.07	-6.0

Number of revolutions of front wheels for : N.A
one revolution of rear-wheels : 1.399

3.3 PTO PERFORMANCE TEST

S. No.	Particulars	Base Model	Variant Model
1.	Date(s) of test	18.08.2016 to 31.08.2016 & 14.12.2016 to 16.12.2016	10.07.2017
2.	Tractor run at this Institute prior to start of PTO test, (h)	12.81	3.3
3.	Dynamometer test bench used	Eddy Current, SAJ AG-250	

Maximum power two hours test under natural ambient condition was conducted. The results of Power take-off performance test under natural ambient, of base & variant models are tabulated in Table-1.

Table-1

1	Power, (kW)	Speed, (rpm)		Fuel Consumption			Specific energy, (kWh/l)
		PTO	Engine	(l/h)	(kg/h)	(kg/kWh)	
1	2	3	4	5	6	7	8
a) Maximum power – 2 hours test (under natural ambient condition):							
Base model	14.5	551	2198	4.66	3.90	0.269	3.10
Variant model	14.3	551	2198	4.98	4.16	0.291	2.87

S. No.	Parameters	Base Model		Variant Model
		Natural Ambient	High Ambient	Natural Ambient
1	2	3	4	5
i)	No load maximum speed, (rpm)	2390	2382	2382
ii)	Equivalent crankshaft torque at maximum power (Nm)	62.9	60.5	62.3
iii)	Maximum equivalent crank shaft torque (Nm)	69.7	66.3	--
iv)	Engine speed at maximum equivalent crankshaft torque, (rpm)	1301	1600	--
v)	Backup torque (%)	10.8	9.6	--
vi)	Smoke level, maximum light absorption coefficient (per meter)	0.09	-	--
vii)	Range of atmospheric condition :			
	- Temperature, (°C)	26 to 31	41 to 44	27
	- Pressure, (kPa)	98.9 to 99.6	100 to 100.4	98.5 to 98.5
	- Relative humidity, (%)	35 to 45	21 to 24	71 to 73
viii)	Maximum Temperature, (°C):			
	- Engine oil	81	106	105
	- Coolant (water)	90	103	81
	- Fuel	53	67	53
	- Air intake	35	51	30
	- Exhaust gas	570	587	648
ix)	Pressure at maximum power:			
	- Intake air, (kPa)	1.9 to 2.1	1.8 to 2.1	1.9 to 2.2
	- Exhaust gas, (kPa)	9.2 to 13.0	9.1 to 12.3	11.2 to 13.6
x)	Consumptions:			
	- Lub. oil, (g/kWh)	--	0.37	--
	- Coolant (water), (% of total coolant capacity)		2.17	--

4.0 OTHER APPLICABLE TESTS

4.1 DRAWBAR PERFORMANCE TEST

	Base Model	Variant Model
Date(s) of test	: 09 & 10.01.2017	19 & 20.08.2017
Tractor run at the Institute prior to start of drawbar performance test, (h)	: 38.2	6.3
Type of track	: Concrete	Concrete
Height of drawbar, (mm):		
- Without ballast	: 450	450

4.1 The results of drawbar performance test consisting of maximum power and pull without ballast is tabulated in Table - 2.

Table - 2

DRAWBAR PERFORMANCE TEST

Gear	Travel Speed, (km/h)	Draw-bar power, (kW)	Draw-bar pull, (kN)	Engine Speed, (rpm)	Wheel Slip, (%)	Fuel consumption		Specific Energy, (KWh/l)	Atmospheric conditions				Temperature (°C)			Max. sustained pull, (kN)
						(kg/kWh)	(l/h)		Temp (°C)	Pressure (kPa)	R.H. (%)	Fuel	Trans oil	Coolant (water)	Eng. inc. oil	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
i) Maximum power test (Tractor Unballasted with 4 WD in engaged condition):																
L1	2.55	5.7	7.98	2305	15.3	0.416	2.84	2.0	31	97.5	69	39	77	78	99	9.29
L2	4.23	9.6	8.19	2270	15.0	0.354	4.07	2.35	31	97.5	67	38	78	82	102	9.74
L3	6.84	11.0	5.80	2197	11.8	0.373	4.91	2.24	31	97.5	76	39	61	83	99	6.52
L4	10.42	11.4	3.93	2202	8.8	0.364	4.96	2.30	29	97.5	74	37	53	81	90	4.36
H1	4.79	10.8	8.14	2265	15.1	0.347	4.48	2.41	30	97.5	75	38	63	79	98	8.19
H2	8.38	11.3	4.84	2208	9.7	0.370	5.0	2.26	30	97.5	72	38	58	81	96	5.49

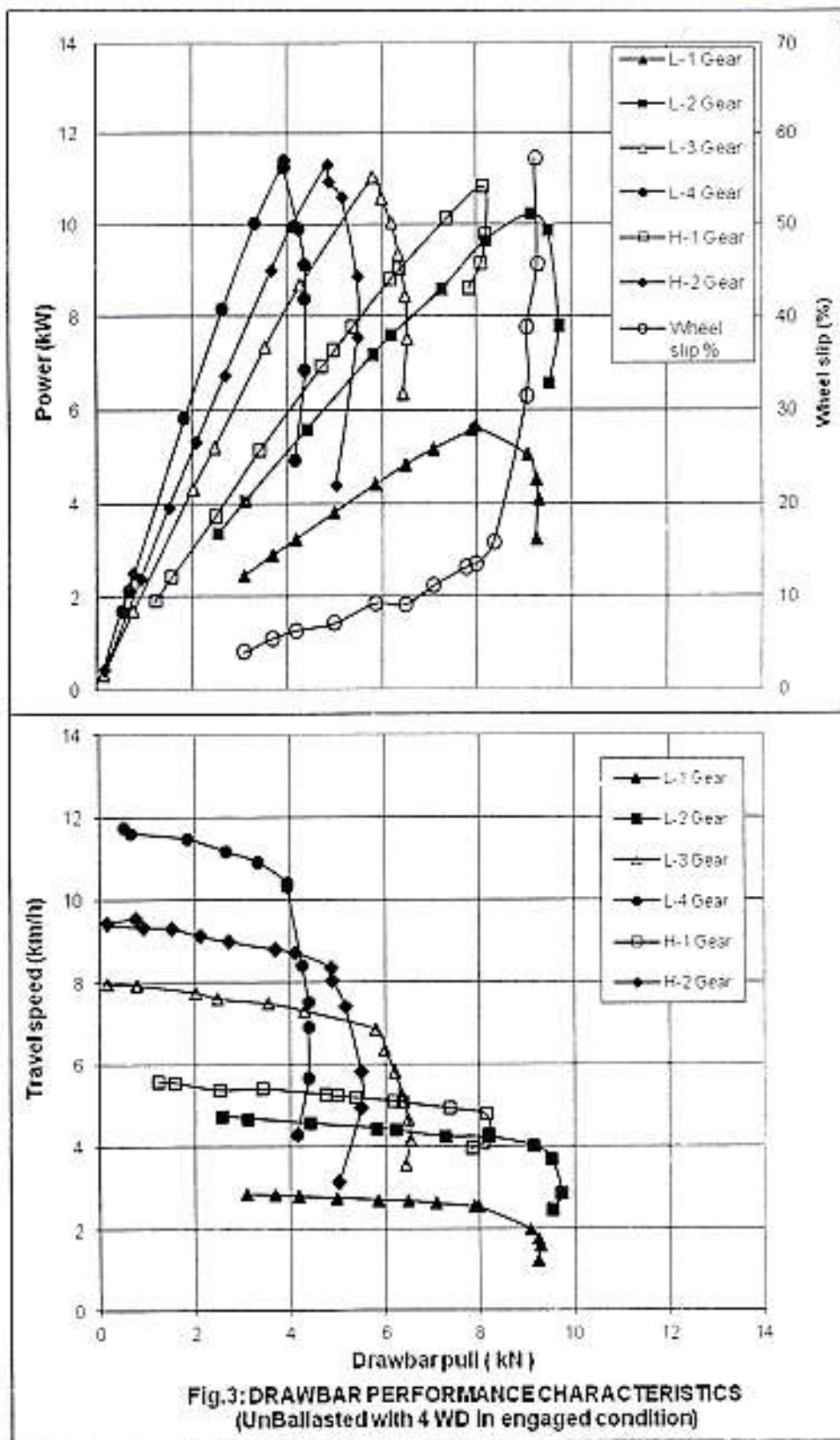
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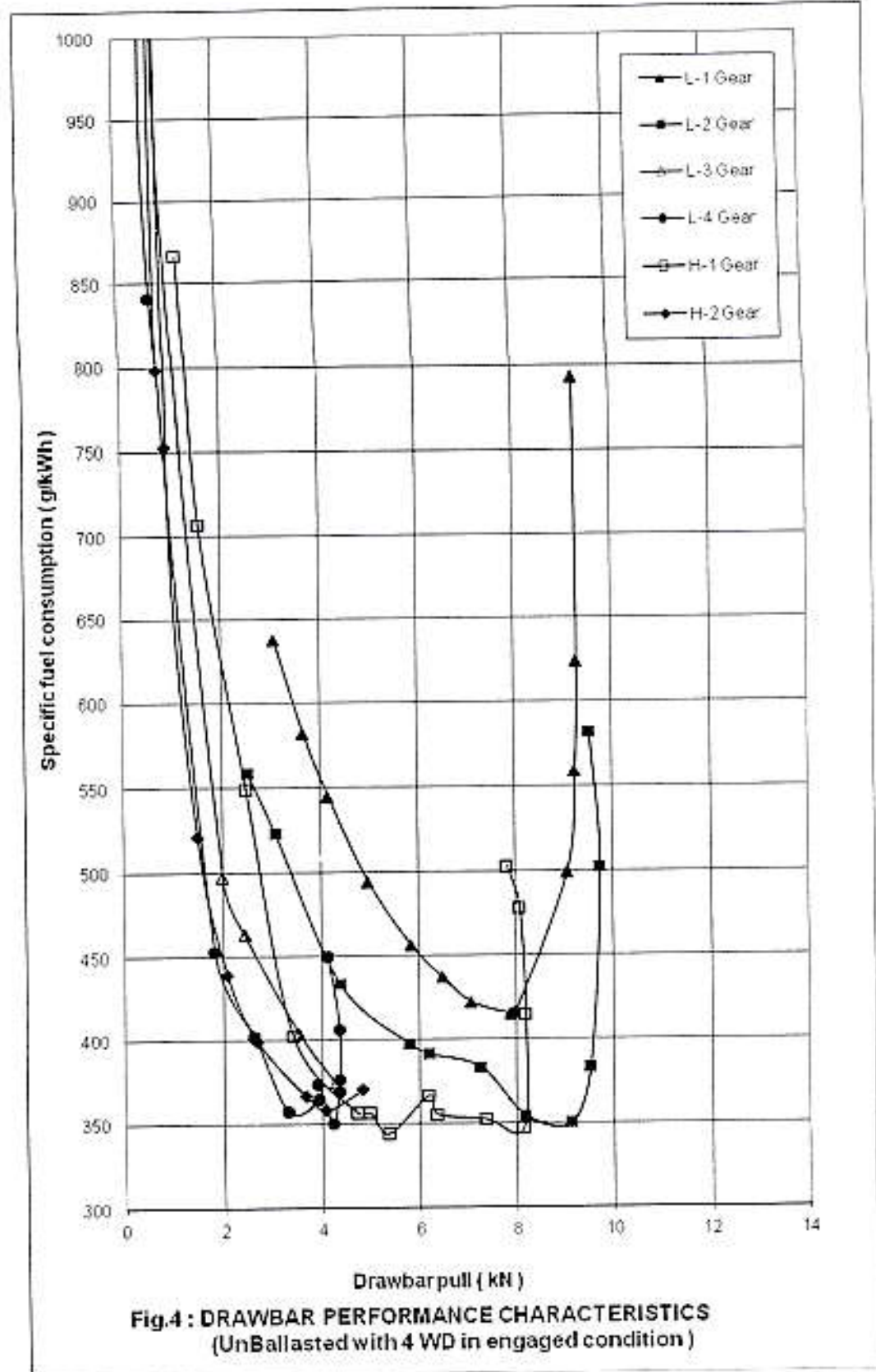
Gear	Travel Speed, (km/h)	Draw-bar power, (kW)	Draw-bar pull, (kN)	Engine Speed, (rpm)	Wheel Slip, (%)	Fuel consumption		Specific Energy, (kWh/l)	Atmospheric conditions				Temperature (°C)			Max. sustained pull, (kN)
						(kg/kWh)	(l/h)		Temp (°C)	Pressure (kPa)	R.H. (%)	Fuel	Trans oil	Coolant (water)	Eng. oil	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
iii) Five hours test at 75 percent of pull obtained at max. Power (Tractor Unballasted with 4 WD in engaged condition):																
H1	5.06	8.6	6.13	2275	10.7	0.353	3.63	2.37	29 to 31	97.4 to 97.8	58 to 71	36 to 41	75 to 80	79 to 80	97 to 101	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (Tractor Unballasted with 4 WD in engaged condition):																
L1	2.56	5.7	7.99	2311	15.2	0.445	4.26	1.88	24 to 29	97.8 to 97.9	67 to 87	30 to 37	39 to 61	75 to 79	84 to 95	--

i) The coolant (water) and lub oil consumption during 10 hours test were observed as nil and nil ml/hr respectively

ii) Tyre Creeping, (mm):
 -LHS : NIL
 -RHS : NIL

iii) Maximum temperatures during entire drawbar test, (°C):
 Engine oil : 102
 Coolant (water) : 90
 Transmission oil : 80
 Fuel : 41





4.2 LOCATION OF CENTRE OF GRAVITY

Condition	Particulars	Base model	Variant model
		Co-ordinates	
Tractor unballasted condition but with all the liquid reservoirs full & the operator replaced by a 75 kg mass on the seat	Height above ground, (mm)	558	591
	Distance forward from the vertical plane containing the axis of rear wheels, (mm)	594	668
	Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm)	6.3 (towards RHS)	8.0 (toward RHS)

4.3 TURNING ABILITY

Test sample	Characteristics	Minimum turning diameter,(m)		Minimum clearance diameter,(m)	
		LHS	RHS	LHS	RHS
Base model	Brake applied	5.59	5.62	6.12	6.12
	Brakes released	6.12	6.29	6.64	6.81
Variant model	Brake applied	5.78	5.31	6.10	5.63
	Brakes released	6.64	6.46	6.96	6.78

4.4 NOISE MEASUREMENT

4.4.1 Noise at bystander's position:

	Base model	Variant model
Date of test	: 23.12.2016	19.05.2017
Type of track	: Concrete	Concrete
Background noise level, dB (A)	: 54	52
Atmospheric conditions:		
Temperature, (°C)	: 24	43
Pressure, (kPa)	: 97.4	97.6
Relative humidity, (%)	: 52	22
Wind velocity, (m/s)	: 1.7	1.2

TEST DATA:

S. No.	Gear	Travelling speed before acceleration, (kmph)		Noise level, dB (A)	
		Base model	Variant model	Base model	Variant model
1.	L1	3.18	2.26	81	76
2.	L2	5.27	3.81	79	76
3.	L3	8.32	6.06	80	76
4.	L4	12.19	8.99	79	77
5.	H1	6.04	4.32	79	77
6.	H2	9.85	7.16	80	76
7.	H3	16.06	11.60	79	77
8.	H4	23.51	16.96	80	79

4.4.2 Noise at operator's ear level:

	Base model	Variant model
Date of test	: 09.01.2017	19.08.2017
Type of track	: Concrete	Concrete
Background noise level, dB(A)	: 55.0	53
Atmospheric conditions:		
Temperature, (°C)	: 21	29
Pressure, (kPa)	: 99.6	97.5
Relative humidity, (%)	: 42	63
Wind velocity, (m/s)	: 1.1	1.9

TEST DATA:

Gear	Drawbar pull at which the tractor develops the max. noise level, (kN)		Corresponding travelling speed, (kmph)		Noise level dB (A)	
	Base model	Variant model	Base model	Variant model	Base model	Variant model
L1	6.74 to 6.84	4.97 to 7.98	2.77 to 2.74	2.76 to 2.55	92	90
L2	6.73 to 7.08	6.88 to 8.11	4.63 to 4.53	4.32 to 4.23	93	93
*L3	5.84 to 5.91	3.53 to 5.89	7.53 to 7.32	7.49 to 6.63	94	94
L4	N.A	3.31	N.A	10.91	N.A	93
H1	7.34	8.14	5.17	4.79	93	93
H2	3.36 to 4.80	2.89 to 4.76	9.67 to 9.04	9.01 to 8.40	93	93

* Gear corresponds to the nominal travelling speed nearest to 7.5 kmph.

5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

S. No.	Adjustments/Defects/Breakdowns and Repairs	Tractor run hours
-	-None-	-

**6. COMPARISON BETWEEN BASE MODEL AND VARIANT MODEL
(Based on Table 3 & 4 of Indian Standard 12207: 2014)**

Sl. No.	Clause No.	Features	Observation on base model (T-1081/1606/2017, April, 2017)	Observation on variant model	Remarks		
1	2	3	4	5	6		
1.	i)	Single/dual/Dry / wet/ Independent clutch/ Increase in size of clutch	Single, dry friction plate of 212 mm diameter	Single, dry friction plate of 212 mm diameter	No change		
2.	ii)	Air cleaner:	Same configuration in base & variant models (refer para 3.1.6)		No change		
3.	iii)	Exhaust system:	Same configuration in base & variant models (refer para 3.1.6)		No change		
4.	iv)	Location and type of operating controls	Same configuration in base & variant models (refer para 3.1.12.1, 3.1.12.2, 3.1.14.1 & 3.1.17)		No change		
5.	v)	Gear Box:					
		- Type	Mechanical, Combination of constant mesh and synchromesh gears.		No change		
Reduction ratio of transmission:							
		Movement	Gear	Base model	Variant model	Variation (%)	Remarks
	Forward		L1	108.57	125.53	-15.6	Within limit
			L2	84.39	74.6	-15.9	-do-
			L3	39.95	46.29	-15.9	-do-
			L4	27.21	31.51	-15.8	-do-
			H1	56.89	65.5	-15.1	-do-
			H2	33.72	39.07	-15.9	-do-
			H3	20.96	24.26	-15.7	-do-
			H4	14.23	16.48	-15.8	-do-
	Reverse		LR	144.46	166.98	-15.6	-do-
			HR	75.74	87.48	-15.5	-do-



T-1109/1635/2017		CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)			
1	2	3	4	5	6
		Range of speeds (kmph):			
		- Forward	3.02 to 23.03	2.85 to 21.59 (-6.1 to -5.7 % variation)	Changed (Within limit)
		- Reverse	2.27 to 4.33	2.14 to 4.07 (-6.0 to -5.7% variation)	
6.	vi)	Additional no. of speed	None	None	No change
7.	vii)	Differential unit:	Crown wheel and pinion with differential unit, accommodated inside differential housing.		No Change
		Reduction through crown wheel & pinion	4.27:1 (47/11T)	5.375:1(43/8T)	Changed
8.	viii)	Fitment of accessories:			
		- Additional hydraulic pump	None	None	No Change
		- Air compressor	None	None	No Change
		- Radiator:			
		Bare radiator capacity, (l)	2.12	2.17	No Change
		Total coolant capacity, (l)	4.60	4.66	No Change
9.	ix)	Steering System and type	Mechanical, recirculation ball & nut type having single drop arm.		No Change
10.	x)	Brake system:			
		Type of actuation system for brake & clutch.	Independent / combined pedal operation by right foot & by pressing the clutch pedal, provided on LHS.		No Change
		Area of brake liners (cm ²)	82.08(on each wheel side)		No Change
11.	xi)	Provision of accessories:			
		- Min. & Max. height of rear towing hitch (mm)	330 (fixed)	350 (fixed)	Similar
12.	xii)	Type of three point linkage	Same configuration in base & variant models (refer para 3.1.13.2 & 3.1.13.3)		No change
13.	xiii)	PTO shaft (s):	Same configuration in base & variant models (refer para 3.1.14) except the following:		No change
14.	xiv)	Engine to PTO speed ratio:			
		Gear No.	Engine to PTO speed ratio		
		L1 and H1	3.993 :1	3.993 :1	No change
		L2 and H2	2.371 :1	2.371 :1	No change
		L3 and H3	1.474:1	1.474:1	No change
		L4 and H4	1 :1	1 :1	No change
		LR and HR	5.314 : 1	5.314 : 1	No change
15.	xv)	Features and Location of Electrical and Instrumentation:			
		Battery:			
		Make & Model	Exide & 65D26 RMF	Exide & MF570R	Changed
		Capacity & rating	65 Ah at 20 hours discharge rating.	70 Ah at 20 hours discharge rating.	-do-
		Starter:			
		Make & model	Lucas TVS & M70GRS	Lucas TVS & M70	No Change
		Generator:			
		Make & model	Autolek	Autolek	No Change
		Instrumentation panel:	Same configuration in base & variant models (refer para 3.1.11).		No change

1	2	3	4	5	6	
16.	xvi)	Tyres size & Ply rating:				
		Front wheel tyre type , size & ply rating	Pneumatic, ribbed, 5.20- 14, 8PR	Pneumatic, traction, 8.00 -12, 4 PR	Changed	
		Rear wheel tyre size & ply rating	8.00-18 ,4PR	8.3-20, 6PR	-do-	
		Front wheel rim size	SSWL ,3.5 J x 14	CWPL ,5 J x 12	-do-	
		Rear wheel rim size	CWPL, 5.5 F x 18	CWPL, W7 x 20	-do-	
17.	xvii)	Type of drive:	2WD	4WD	Changed	
18.	xviii)	Sheet metal:				
		Style of bonnet	Compound	Compound	No Change	
		- Colour	Red	Red	No Change	
		-Decals (Sticker)	CAPTAIN 250 DI	CAPTAIN 250 DI 4WD +	Changed	
		Fitment of ROPS, Cab & Canopy	ROPS not fitted Canopy fitted	ROPS not fitted Canopy fitted	No change	
19.	xix)	Type of hydraulic system:				
		Type of hydraulic pump	Gear type pump	Gear type pump	No change	
		Location of hydraulic pump	In front of engine, below radiator		No change	
		Drive of the hydraulic pump	Driven through crankshaft pulley		No change	
		Rated speed of pump, (rpm)	2200	2200	No change	
20.	xx)	Positioning of Hydraulic Sensing Mechanism	Through top link	Through top link	No change	
21.	xxi)	Change related to ergonomics, safety comfort, statutory / regulatory requirements:				
		a)	IS: 10273	Conformed	Conforms	No change
		b)	IS: 4931	Did not conform	Conformed	Changed
		c)	IS: 4468	Did not conform	Does not conform	No change
		d)	IS: 12953	Conformed	Conforms	No change
		e)	IS: 12343	Did not conform	Does not conform	No change
		f)	IS: 12239 (Pt-I)	Did not conform	Does not conform	No change
		g)	IS: 12239 (Pt-II)	Did not conform	Does not conform	No change
		h)	IS: 8133	Conformed	Does not conform	Changed
		i)	IS: 6283	Did not conform	Conformed	Changed
j)	IS: 14683	Conformed	Conformed	No Change		
22.	xxii)	Final Reduction:	5 : 1 (70/14T)	4.6 : 1 (69/15T)	Changed	
23.	Change related to statutory/ regulatory requirements (As per Table 4):					
	a)	Engine operating principle (spark/ compression ignition, two/four stroke)	Compression Ignition, 4 stroke	Compression Ignition, 4 stroke	No change	
	b)	Number & arrangement of cylinders	Two & vertical ,Inline	Two & vertical ,Inline	No change	
	c)	PTO power (kW)	14.5	14.5	No change	
	d)	Engine displacement (cc)	1290	1290	No change	
	e)	Rated engine speed (rpm)	2200	2200	No change	

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard 12207:2014 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values declared by the applicant/ requirement		As observed		Whether Variant model meets the requirements (Yes/No.)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.1 PTO Performance :								
a)	- Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of -5 / +10% for PTO power >25 kW -7.5/+10% for PTO power ≤ 25 kW or -5 / +10% for Engine power >25 kW -7.5/+10% for Engine power ≤ 25 kW	14.5 (D)	14.5 (D)	14.5	14.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.5 (D)	14.5 (D)	14.5	14.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	259	259	269	291	No
7.1.2 Drawbar performance :								
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	Not applicable		Not applicable		
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	5.80 (D) 5.80 min (R)	6.15 (D) 6.31 min (R)	7.34	8.19	Yes
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Minimum 80 % of PTO power as referred in Sl No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in Sl No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor Minimum 75 % of the engine power as referred in Sl No. ii) a) of engine performance in case of tractors which do not have a PTO shaft	10.87 (D) 10.88 min (R)	10.90 (D) 10.76 min (R)	12.20	11.3	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	120 (D)	58	80	Yes



T-1109/1635/2017 **CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)**

1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.3	Safety features :							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2) - 1999)	--	--	Meets the requirement	Meets the requirement	Yes
b)	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative	As per CMVR 14603-1999	--	--	Meets the requirement	Meets the requirement	Yes
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non-Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--	--	Did not meet the requirement	Does not meet the requirement	No
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	--	Did not meet the requirement	Meets the requirement	Yes
e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	--	Did not meet the requirement	Does not meet the requirement	No
f)	Specification of linkage and swinging drawbars	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	--	Meets the requirement	Meets the requirement	Yes
7.1.4	Labelling of tractors (Provision of labelling plate):							
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--		CAPTAIN		Yes
	2) Model	Evaluative		--		250 DI 4WD +		Yes
	3) Year of manufacture	Evaluative		--		2017		Yes
	4) Engine number	Evaluative		--		SC21307007		Yes
	5) Chassis number	Evaluative		--		D117021304		Yes
	6) Declaration of PTO power, kW	Evaluative		--		14.5		Yes
7.1.5	Literature (Submission to test agency)							
(a)	Operator manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)		Provided		Yes
(b)	Parts Catalogue	Evaluative	Provided/Not Provided			Provided		Yes
(c)	Workshop/Service manual	Evaluative	Provided/Not Provided			Provided		Yes

7.2 Salient Observations:

7.2.1 Laboratory tests:

7.2.1.1 PTO Performance:

- i) The maximum power in case of base & variant model was observed as **14.5 & 14.3 kW** against the declaration of **14.5 kW** respectively. Which is within the tolerance limit specified in IS: 12207-2014.
- ii) The specific fuel consumption in case of base and variant models corresponding to maximum power was observed as **269 & 291 g/kWh** against the declaration of **259 g/kWh** respectively, which does not meet the tolerance limit specified in IS:12207-2014 in case of variant model.

7.2.1.2 Three point linkage:

- i) The diameter of hitch pin hole of upper hitch point of tractor does not meet the requirement of IS: 4468 (Part-1)-1997. This should be looked into for necessary corrective action.

7.2.1.3 Operator's seat:

Vertical distance from Seat Index point to centre of steering control wheel does not meet the requirements of IS: 12343-1998. This should be looked into for necessary corrective action.

7.2.1.4 Location and operation of operator's control:

Working clearance between position control lever and the draft control lever does not meet the requirement of the IS: 12239 (Part-2)-1996. This should be looked into for necessary corrective action.

7.3 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test however suitable draining system should be provided for draining sediment/water.

7.4 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision for spark arresting device in exhaust system.
- ii) The fuel shut-off lever does not remain in stop position
- iii) Vertical distance from SIP to centre of steering control.
- iv) Provision for master shield for PTO shaft
- v) Provision for differential lock.

7.5 Adequacy of Literature supplied with machine:

7.5.1 Literature was supplied with the tractor for reference during the test.

- a) Operator's manual (Captain 250 DI 4WD+ tractors)
- b) Service Manual (Captain 250 DI, Captain DI 250 4WD+ tractors)
- c) Parts catalogue (Captain 250 DI, Captain DI 250 4WD+ tractors)

7.5.1.2 Information related to PTO, Drawbar and hydraulic performance of the tractor such as, maximum engine power, rated engine power, maximum torque, backup torque, specific fuel consumption, maximum drawbar power & pull, hydraulic pump discharge rate, hydraulic power & lifting capacities etc should be included in the technical specification of the tractor for the guidance of the user's.

The results of the tests carried out on variant model "CAPTAIN 250 DI 4WD +" have been compared with those on base model "CAPTAIN 250 DI" and found within the limit, as specified in Indian Standard: 12207-2014.



T-1109/1635/2017 CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

8. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	(5-Months) May,2017 to September,2017	Yes	None

TESTING AUTHORITY:


C.S.RAGHUWANSHI
AGRICULTURAL ENGINEER


C.V.CHIMOTE
TEST ENGINEER


Y.K. RAO
SENIOR AGRICULTURAL
ENGINEER


J.J.R.NARWARE
DIRECTOR

9. APPLICANT'S COMMENTS

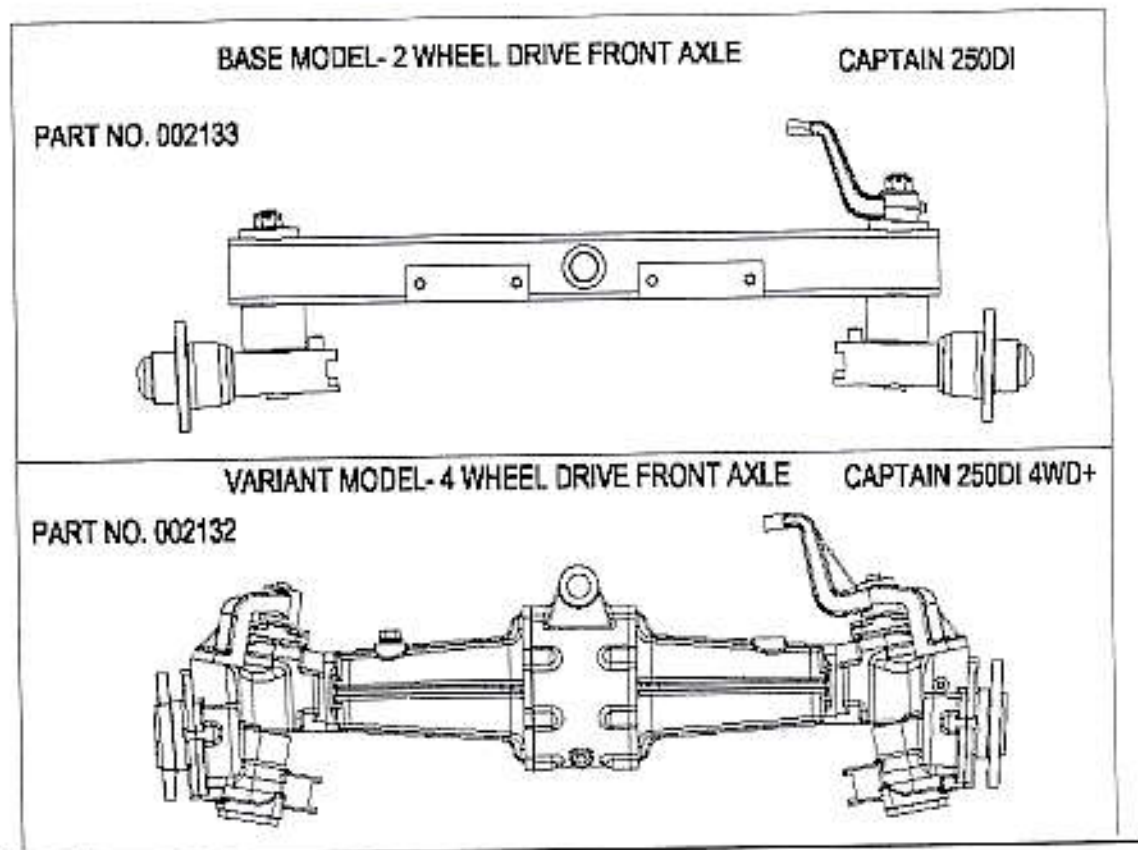
Para No.	Our Reference	Applicant's comments
9.1	7.2.1.1(i)&(ii),7.2.1.2,7.2.1.3 & 7.2.1.4	Observations will be studied and necessary action will be incorporated.
9.2	7.4 & 7.5.1.2	Suggestion & recommendation will be incorporated for the quality of product.



T-1109/1635/2017

CAPTAIN 250 DI 4WD+ TRACTOR- Commercial (Variant)

ANNEXURE-I



ANNEXURE-II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	2.8
3.	Drawbar performance test	12.5
4.	Theoretical speed test	1.2
5.	Centre of gravity of test	0.2
6.	Turning ability test	0.2
7.	Noise measurement	1.7
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	1.0
	TOTAL:	19.6