

व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT (Variant)

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**CAPTAIN 200 DI 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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**CAPTAIN 200 DI TRACTOR- Commercial (Variant)**

Subsequent to the examination of the case in the light of Indian Standard IS 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 under unballast condition
- Centre of gravity of test
- Turning ability test
- Operator's field of vision

**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 20W40	SAE 20W40
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	: CAPTAIN 200 DI 4WD	200 DI	
Type	: Four wheel driven, Agricultural Tractor	Four wheeled, rear wheel drive, agricultural tractor.	
Year of manufacture	: 2014	2015	
Chassis serial number	: C114010031	C215030947	
Country of origin	: India	India	
3.1.2 Engine:	<u>Base model</u>		<u>Variant model</u>
Make	: Marshal motor	Marshal motor	
Model	: FMW-165M	FMW-165M	
Type	: Four stroke, naturally aspirated, Air cooled, direct injection, diesel engine.		
Serial number	: GM-195	GL-181	
Country of origin	: India	India	



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1	2	3	4	5	6
24.	<b>Other changes:</b>				
a)	Type of drive:		4WD	2WD	Changed
b)	Overall Dimensions,(mm) (length, width & height )		2560,1070 & 2000	2595,1070 & 1995	Changed
c)	Wheel base, (mm)		1530	1520	Changed

## 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	<b>PTO Performance :</b>							
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 >26 kW. -7.5/+10% for PTO power ≤ 26 kW or -5 / +10% for Engine power >26 kW. -7.5/+10% for Engine power ≤ 26 kW	10.0	10.0	9.4	10.4	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	10.0	10.0	9.4	10.4	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	245	245	309	329	No
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	51 (D)	51 (D)	48.5	--	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 %, min (R)	10 % min (R)	24.4	--	Yes
f)	<b>Maximum operating temperature (°C)</b>							
	Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	130 (D)	130 (D)	103	77	Yes



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1	2	3	4	5 a	5 b	6 a	6 b	7
2)	Coolant (water)	Evaluative	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	120 (D)	120 (D)	93	76	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.05 (R)	NA	1.0	NA	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter (R)	3.25 per meter (R)	0.21 per meter	NA	Yes
<b>7.1.2 Drawbar performance :</b>								
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	Not specified 6.25 (R) min.	Not specified NA	7.14	NA	Yes
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	Not specified 5.93, min (R)	Not specified 5.48 min (R)	7.85	6.47	Yes
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI 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 SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	7.5 (D) Minimum 7.5 (R) min.	7.5 (D) Minimum 7.8 (R) min.	7.9	8.8	Yes



1	2	3	4	5 a	5 b	6 a	6 b	7
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)	78	64	Yes
<b>7.1.3 Safety features :</b>								
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)	--	--	Meets 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
<b>7.1.4 Labelling of tractors (Provision of labelling plate):</b>								
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--		CAPTAIN		Yes
2)	Model	Evaluative		--		200 DI		Yes
3)	Year of manufacture	Evaluative		--		C215030947		Yes
4)	Engine number	Evaluative		--		GL181		Yes
5)	Chassis number	Evaluative		--		2015		Yes
6)	Declaration of PTO power, kW	Evaluative		--		10		Yes



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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	As per relevant IS Code (IS 8132)	Provided	Yes
(c)	Workshop/Service manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes

**7.2 Salient Observations:**

**7.2.1 Laboratory tests:**

**7.2.1.1 PTO Performance:**

- i) The specific fuel consumption corresponding to maximum power was measured as **329 g/kWh** against the declaration of **245 g/kWh**, which does not meet the requirement of IS:12207-2014 with regard to tolerance.

**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:**

The longitudinal adjustment forward and rearward from the mid position does not meet the requirements of IS: 12343-1998. 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 Field performance test**

**7.4.1 Wetland cultivation (Puddling operation):**

The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation). Hence, the wetland cultivation (puddling operation) was not conducted. **Therefore, the declaration of the fact that the tractor is not suitable for Wetland cultivation (Puddling operation) should be mentioned clearly and boldly in all the literature relevant to this tractor model.**

**7.5 Recommendation with regard to safety on tractor:**

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

- i) Minimum cautionary notice as per clause 11.2 of above referred standard
- ii) Spark arrester has not been provided in the exhaust system.
- iv) Provision of PTO master shield.
- v) Provision of safety against accidental start of engine has not been provided.
- vi) The fuel shut off knob does not remain in STOP position without sustained manual effort.
- vii) Working clearance between position control lever and the draft control lever does not meet the requirement of the relevant IS.
- viii) The symbols for operator's controls such as grease lubricant frequency, oil lubricant type & frequency & for parking brake lever has been not provided and does not meet the requirements of IS: 6283 (Pt- I & II)- 1998.



- 7.6 Adequacy of Literature supplied with machine:**
- 7.6.1** Literature was supplied with the tractor for reference during the test.
- a) Operator's manual (Captain 120 DI, Captain 120 DI 4WD, Captain 200 DI, Captain 200 DI 4WD tractors)
  - b) Service Manual (Captain 200 DI, Captain DI 200 4 WD tractors)
  - c) Parts catalogue (Captain 200 DI, Captain DI 200 4 WD tractors)
- 7.6.1.2** 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 200 DI**" have been compared with those on base model "**CAPTAIN, CAPTAIN 200 DI 4WD**" and found within the limit, as specified in Indian Standard: 12207-2014.

**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	6 Months (July 2015 to December, 2015)	Yes	None

**TESTING AUTHORITY:**

  
**P.C. MESHARAM**  
 SENIOR AGRICULTURAL ENGINEER

  
**C.R LOHI**  
 DIRECTOR

Test Report compiled by: **Shri. Chanchlesh Singh Raghuwanshi**, Senior Technical Assistant.

**9. APPLICANT'S COMMENTS**

Para No.	Our Reference	Applicant's comments
9.1	7.2.1.1(ii), 7.2.1.2(i),(ii), 7.2.1.3, 7.2.1.4, 7.2.1.5, 7.2.1.6 & 7.5.1.2	Suggestion & recommendation will be incorporated for the quality of product.