

व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच)
COMMERCIAL TEST REPORT (1st Batch)

संख्या/No. : T- 1545/2073/2021
माह/Month : June, 2021

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 30/06/2026 तक वैध है। / THIS TEST REPORT IS VALID UPTO: 30/06/2026)



CAPTAIN, 250 DI TRACTOR



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

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(An ISO 9001: 2015 Certified Institute)

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The “CAPTAIN 250 DI” tractor model had undergone “Initial Commercial Test” at this Institute vide test report No. T- 1081/1606/2017 released in April, 2017. Now the applicant has submitted an application No. 28/2020-21/3 dated: 23.10.2020 for batch testing of “CAPTAIN 250 DI” tractor.

All necessary tests as per Table-1 of clause 6.0 of IS: 5994 - 1998 (Reaffirmed in January, 2019) were carried out and test report released as under.

Manufacturer	: M/s. Captain Tractors Pvt. Ltd., Padavala Road, Tal: Kotda Sangani, Veraval (Shapar), Dist.: Rajkot-360024, Gujaraat, INDIA
Test requested by (applicant)	: The manufacturer
Selected for test by	: The manufacturer
Place of running-in	: At manufacturer’s work place
Duration of said running-in, (h):	
- Engine	: 18
- Transmission	: 08
Method of Selection	: Due to Covid-19 Pandemic, it was not possible to conduct the random selection nor was possible for applicant to facilitate the random selection. As a last resort applicant requested to allow the direct submission of Test Sample, which was allowed.

1. SPECIFICATIONS

1.1 Tractor:	
Make	: Captain
Model	: 250 DI
Brand Name	: Captain
Variants, if any	: Yes

S. No.	Variant model (*)	Variant features
1.	Captain 250 DI 4WD +	4WD & Change in nominal speeds.
Remark (*) :- The variant model has been tested at this Institute vide test report No. T-1109/1635 /2017 released in September, 2017.		

Type	: Four wheeled, Rear wheel driven, Unit Construction, General purpose, Agricultural tractor.
Month & Year of manufacture	: 11 / 20
Chassis number	: D220105508
Country of origin	: India
1.2 Engine:	
Make	: Simpson & Co. Ltd.
Model	: TIII A SC213-F20
Type	: Four stroke, Liquid cooled, Naturally aspirated, Direct injection, Diesel engine.
Serial number	: SC21316569
1.2.1 Engine speed(Manufacturer’s recommended production setting), (rpm):	
- Maximum speed at no load	: 2300 to 2400
- Low idle speed	: 700 to 800
- Speed at maximum torque	: 1200 to 1300
Rated speed, (rpm):	
- For PTO use	: 2200
- For drawbar use	: 2200

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14. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

14.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluation (not-mandatory) parameter applicable for qualifying Minimum Performance Criteria as per Clause-4 (Table-1) of IS: 12207-2019 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:-

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D) / Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
14.1.1	PTO Performance :					
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power or engine power >26 kW, $\pm 10\%$ for PTO power or Engine power ≤ 26 kW.	14.5 (D)	16.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.5 (D)	14.2	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	275 (D)	246	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	80.0 (D)	78.5	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min.	12 % (D) 12 % (R)	27.4	Yes
f)	Maximum operating temperature(^o C)					
	1) Engine oil	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)	119	Yes
	2) Coolant (liquid)	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)	119	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.48 (Maximum) (R)	0.37	Yes
h)	Smoke level, (m ⁻¹)	Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 (Maximum) (R)	0.22	Yes

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1	2	3	4	5	6	7
14.1.2	Drawbar performance:					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	Not applicable		---
b)	Maximum drawbar pull with unballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without / standard ballast	6.25 (D) 6.25 (Minimum) (R)	6.91	Yes
c)	Maximum drawbar power without ballast, or with standard ballast as the case may be, 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.	10.88 (D) 12.0 Minimum (R)	12.8	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	80	Yes
14.1.3	Power lift and hydraulic pump performance :					
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Evaluative	±10 percent	6.00 (D)	6.53	Yes
	2) With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW. and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft	3.48 (D) 3.77 Minimum (R)	3.83	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) 50 Maximum (R)	00	Yes
14.1.4	Brake performance at 25 kmph:					
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with unballast, (m): [Remark: Manufacturer has not recommended ballast mass for road work, therefore brake test was conducted under unballasted condition only]					
	1) Cold brake	Evaluative	10	10 (R)	4.80	Yes
	2) Hot brake	Evaluative	10	10 (R)	5.45	Yes

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1	2	3	4	5	6	7
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	257 to 362	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever, N	Evaluative	Yes / No	Yes (R)	425	Yes
14.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	79	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	90	Yes
14.1.6	Amplitude of mechanical vibrations at :					
	1) Left foot rest	Non Evaluative	100 microns (max)	100(R)	119	No
	2) Right foot rest		-do-		92	Yes
	3) Seat (with driver seated)		-do-		55	Yes
	4) Steering wheel		do-		152	No
14.1.7	Air cleaner oil pull over:					
	Maximum air cleaner oil pull over	Evaluative	0.25 % (max.)	Dry type air cleaner is provided	Not applicable	
14.1.8	Haulage requirements:					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	3.0 (D)	3.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	8.0 to 10.0 (D)	9.85 to 10.09	No
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	50 to 70 (D)	33.04 to 33.85	No
14.1.9	Wetland cultivation :					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingresses of water and / or mud (R)	Recommended as not suitable for puddling test by the manufacturer	Not applicable
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine Oil	-do-				
	5) Transmission Oil	-do-				

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1	2	3	4	5	6	7	
14.1.10	Safety features :						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulics pipes(as per IS-12239 Part 2)		Meet the requirements	Yes	
b)	Lighting arrangement	Evaluative	As per CMVR		Meet the requirements	Yes	
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)		Not applicable	---	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		Meet the requirements	Yes	
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)		Does not meet the requirements	No	
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)		Meet the requirements	Yes	
g)	Specifications of Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)		Not provided	Not applicable	
h)	1) Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 kmph		4.33 kmph (Meet the requirements)	Not required	
	2) Audible warning signal on tractor.	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor shall be activated.		Not fitted	Not applicable	
14.1.11	Labelling of tractors (Provision of labelling plate):						
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum declared value of PTO power in kW and for month & year of manufacture in numerical MM YY Digit 01-12 in box No.1 for MM will represent the month and next two digit in the box No.2 for YY will represent the year of manufacturing		Captain	Yes	
	2) Model	Evaluative				250 DI	Yes
	3) Month & Year of manufacture	Evaluative				11 / 20	Yes
	4) Engine number	Evaluative				SC21316569	Yes
	5) Chassis number	Evaluative				D220105508	Yes
	6) Declaration of PTO power, kW	Evaluative				14.5	Yes

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1	2	3	4	5	6	7
14.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	95.20 (D)	95.000 to 95.012	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.25 (D)	0.113 to 0.118	Yes
(c)	Piston diameter at skirt, (mm)	Non Evaluative		94.80 (D)	94.893 to 94.899	Yes
(d)	Ring end gap, (mm):					
	- Top comp. ring.	Evaluative	-do-	1.50 (D)	0.40	Yes
	- 2 nd comp. ring.		-do-	1.50 (D)	0.45	Yes
	- Oil ring.		-do-	1.50 (D)	0.20	Yes
(e)	Ring groove clearance, (mm):					
	- Top comp. ring.	Evaluative	-do-	0.40 (D)	0.095 to 0.108	Yes
	- 2 nd comp. ring.		-do-	0.40 (D)	0.052 to 0.064	Yes
	- Oil ring.		-do-	0.40 (D)	0.047 to 0.053	Yes
(f)	Diametrical clearance of main bearings, (mm):	Evaluative	-do-	0.40 (D)	0.050 to 0.086	Yes
(g)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.40 (D)	0.055 to 0.082	Yes
	- Axial	Evaluative	-do-	0.80 (D)	0.30	Yes
(h)	Crankshaft end float, (mm)	Evaluative	-do-	0.80 (D)	0.26	Yes
(j)	Clearance between king pin and bush,(mm)	Non Evaluative	-do-	Tapper roller bearings (I'd No. PAB12435) are provided		Not Applicable
(k)	Clearance between center pin and bush,(mm)	Non Evaluative	-do-	8.00 (D)	0.26 to 0.30	Yes
14.1.13	Literature (Submission to test agency)					
(a)	Operator manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided / Not Provided	Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes
14.1.14	Fitment of Roll Over Protective Structure (ROPS): for tractors having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:11821 or OECD code or equivalent International Standard	Provided	Not Fitted	Not Applicable
14.1.15	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
14.1.16	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Not Fitted	Not Applicable

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14.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):					
S. No.	Category of Breakdown	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the requirement (Yes/No.)
1.	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing	None	Yes
2.	Major breakdowns	Evaluative	There are not more than 1 major breakdowns and neither of them is of repetitive nature	Major (Mj-21)	Yes
3.	Minor breakdowns	Evaluative	There are not more than 3 minor defects during the test and the frequency of each is not be more than two	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed four that is, (1 major + 3 minor) or 4 minor breakdowns	One Major (Mj-21)	Yes

14.3 Salient Observations:

14.3.1 Laboratory tests:

14.3.1.1 PTO Performance Test:

- i) The maximum PTO power was recorded as **16.0 kW** against the declaration of **14.5 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The rated PTO power was recorded as **14.2 kW** against the declaration of **14.5 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The specific fuel consumption corresponding to maximum power was recorded as **246 g/kWh** against the declaration of **275 g/kWh**, which is within the tolerance limit of IS: 12207-2019.
- iv) The maximum equivalent crankshaft torque was recorded as **78.5 N-m** against the declaration of **80.0 N-m**, which is within the permissible limit as specified in IS: 12207-2019.
- v) The backup torque is **27.4 %** and meets the evaluative requirement of IS: 12207-2019.

14.3.1.2 Hydraulic performance test:

- i) During hydraulic pump performance test leakage of hydraulic oil was observed from hydraulic oil delivery pipe line connecting to hydraulic pump. Thereafter, delivery pipe line (Part no. 011801) was replaced with new one of same specification. The said breakdown is categorized under **Major (Mj-21)** as per IS:12207-2019.
- ii) Maximum lifting force capacity at lower hitch point was recorded as **7.62 kN** against the requirement of **5.40 to 6.60 kN**, which was not meeting the evaluative requirement of IS: 12207-2019.

Thereafter, applicant has submitted vide letter No. Nil, dated: 15.03.2021 and requested for **Repeat Test** after adjusting the cylinder safety and hydraulic pump relief valve pressure to the recommended values i.e. **120 and 115 bar** respectively. Thereafter, testing authority has accepted the request of applicant and after adjusting pressure of cylinder safety and hydraulic pump relief valve to 120 & 115 bar respectively and **Repeat Test** was carried out.

In view of clause 3.2.3 of IS:12207-2019, the same was allowed.

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14.3.1.4 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies / components marked as (*) in Chapter – 8 of this test report is on higher side. This calls for dampening down of vibrations especially on left foot rest and steering control wheel to improve the operational comfort and service life of components.

14.3.1.5 Three point linkage:

Diameter of upper hitch pin hole does not meet the requirement of IS:4468- 1993 (Part-2) (Reaffirmed in January, 2019). This should be looked into for necessary corrective action

14.3.1.6 Field performance:

14.3.6.1 Wet land cultivation (Puddling Operation):

The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation) and therefore, the wetland cultivation (puddling operation) was not conducted during Initial Commercial Testing of this tractor model. Therefore, it is recommended that in all the literature this fact that the tractor is not suitable for wetland (puddling) operation should be mentioned clearly & boldly in all the relevant literature of the tractor & also a cautionary notice regarding non-suitability of tractor for puddling operation may be displayed on the bonnet of the tractor also.

14.4 Maintenance / Service Problems:

No noticeable maintenance / service problem was observed during the test.

14.5 Recommendation with regard to safety on tractor:

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

- i) There shall be provision to stay fuel shut-off knob in “STOP” position as per IS:8133-1983 (Re-affirmed in January, 2019)
- ii) There shall be provision of hand holds for easy mounting and dismounting on tractor as per IS: 12239 (Part-1)-2018.
- iii) There shall be provision of spark arrester in the exhaust system of tractor’s engine as per IS:12239 (Part-2)-1999 (Re-affirmed in January, 2019).
- iv) There shall be provision of master shield around the PTO shaft as per IS:4931-1995 (Reaffirmed in January, 2019).

14.6 Adequacy of Literature:

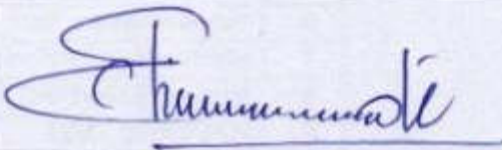
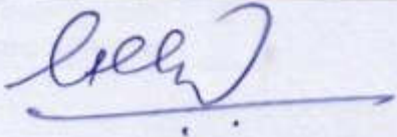
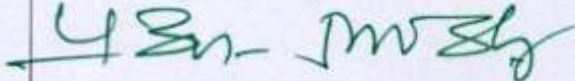
14.6.1 Following literature of following tractor models were supplied with the test sample for reference during the test.

- i) Operator’s Manual of CAPTAIN 200 DI, 200 DI 4WD, 250 DI, 250 DI 4WD, 250 DI 4WD+, 280 4WD and 280 DX tractor models
- ii) Tractor Parts Catalogue of CAPTAIN 250 DI tractor model.
- iii) Tractor Parts Catalogue of CAPTAIN 250 DI tractor model.

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- 14.6.2** Literatures submitted by applicant are found sufficient, **except the following:**
- i) Service schedule and routine maintenance chart is not provided in Operator's and Service manual.
 - ii) Various lubricants' grade recommended for different assembly and subassembly of tractor is not available in Service manual.
 - iii) Brand name of coolant recommended for cooling system of tractor is not available in Operator's and Service manual.
- 14.6.3** The literature should be brought out in national as well as other regional languages of India for guidance of users.

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
Y. K. RAO SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

Draft Test Report is compiled by: **Sh. Rajneesh Patel**, Agricultural Engineer.

15. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
--Nil--		

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ANNEXURE - I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	26.00
2.	PTO Performance test	11.98
3.	Power lift and hydraulic pump performance test	3.75
4.	Drawbar performance test	14.00
5.	Brake test	1.00
6.	Noise measurement	1.16
7.	Mechanical vibration test	1.00
8.	Nominal speed test	1.07
B.	HAULAGE TEST	7.26
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	5.51
TOTAL:		67.22