

(यह परीक्षण रिपोर्ट 31/07/2023 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 31/07/2023)



CAPTAIN 280 4WD TRACTOR



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
कृषि, सहकारिता एवं किसान कल्याण विभाग
मशीनीकरण एवं प्रौद्योगिकी प्रभाग

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Department of Agriculture, Cooperation & Farmers Welfare, Mechanization & Technology Division)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

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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	SAE 15W40	SAE 15W40
2.	Main gear box	SAE 90	SAE 90
3.	High-low gear box assembly, rear differential unit, rear axle & rear final drive, hydraulic and brake system	5W30	Oil originally filled in the tractor was not changed
4.	Front Differential unit, front axle & front final drive	SAE 90	-do-
5.	Steering gear box	SAE 90	-do-
6.	Grease	MP-3	MP-3

3. ESSENTIAL TESTS

3.1 SPECIFICATIONS

3.1.1	Tractor:	Base model	Variant model
	Make	:	Captain
	Model	:	250 DI 280 4WD
	Type	:	Four wheeled, rear wheel driven, Standard Agricultural Tractor Four wheeled, four wheel driven (4WD), Standard Agricultural Tractor
	Month & Year of manufacture	:	2016 05/19
	Chassis serial number	:	D216010513 D119053846
	Country of origin	:	INDIA
3.1.2	Engine:		
	Make	:	Simpson & Co. Ltd. Chennai
	Model	:	T III A SC213-F20 T III A SC213-F20.1
	Type	:	Four stroke, water cooled, naturally aspirated, direct injection, diesel engine
	Serial number	:	SC21304397 SC21313943
	Country of origin	:	India
	Engine speed (rpm), (Manufacturer's recommended production setting),:		
	- Maximum speed at no load	:	2300 to 2400 2600 to 2900
	- Low idle speed	:	700 to 800 800 to 1100
	- Speed at maximum torque	:	1200 to 1300 1400 to 1700
	Rated speed, (rpm):		
	- For PTO use	:	2200 2500
	- For drawbar use	:	2200 2500
3.1.3	Cylinder & Cylinder Head:		
	Number	:	Two
	Disposition	:	Vertical, Inline
	Bore/stroke, (mm)	:	95 / 91
	Capacity as specified by the applicant, (cc)	:	1290
	Compression ratio	:	18.3 ± (0.3) : 1



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1	2	3	4	5	6	
17.	xvii)	Other changes:				
	a)	Engine model	TIII A SC213-F20	TIII A SC213-F20.1	Changed	
	b)	Reduction through crown wheel & pinion	4.27:1 (47/11T)	5.375:1(43/8T)	Changed	
	c)	Reduction through final drive	5.00:1 (70/14T)	4.50:1 (54/12T)	Changed	
	d)	Front differential & front final drive	Various configuration in Base model (refer para 3.1.12.6 & 3.1.12.7)		Changed	
	e)	Front Towing hitch	Various configuration in base models (refer para 3.1.15.1)		Changed	
	f)	Rear Towing hitch	Various configuration in base models (refer para 3.1.15.2)		Changed	
	g)	Wheel equipments	Various configuration in base models (refer para 3.1.18)		Changed	
	h)	Over all dimensions,(mm):				
		Length/Width/Height	2630/1075/1700	2625/1080/1300	Changed	
	i)	Wheel base	1555	1545	Similar	
	j)	Unballasted Mass of tractor, (kg):				
		Front /Rear/Total	380/530/910	430/560/990	Changed	
	k)	Decals (stickers)	CAPTAIN 250 DI	CAPTAIN 280 4WD	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: 2019** for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

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 >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	14.5 (D)	16.8 (D)	14.5	17.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.5 (D)	16.8 (D)	14.5	17.1	Yes



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1	2	3	4	5 a	5 b	6 a	6 b	7
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	259	259	269	274	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	80	80	69.7	75.3	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min.	7 (D) 7 (R) Minimum	12 (D) 12 (R) Minimum	10.8	15.7	Yes
f)	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 (R) Maximum	3.25 (R) Maximum	0.09	0.26	Yes
7.1.2	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		Not applicable		
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast	5.80 (D) 5.80 min (R)	6.80 (D) 6.80 min(R)	7.34	9.16	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.	10.8 (D) 10.88 min (R)	12.8 (D) 12.6 Min (R)	12.20	13.6	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	81	Yes



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1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.3	Brake performance at 25 kmph:							
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road ballast, (m):							
	1) Cold brake	Evaluative	10	10	10	6.80	6.10	Yes
	2) Hot brake	Evaluative	10	10	10	7.25	6.40	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	600	280 to 305	170 to 200	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 / No	Yes / No	Yes	Yes	Yes
7.1.4	Noise measurement:							
a)	Maximum ambient noise emitted by the tractor at bystanders position, dB(A)	Evaluative	88 dB (A) for > 1.5 tonne GWV & 85 dB (A) for < 1.5 tonne GWV (as per CMVR)	88	85	81	81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	96 (as per CMVR)	96	96	94	95	Yes
7.1.5	Safety features :							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulics pipes(as per IS-12239 Part 2)	--	--	Meets the requirement	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	--	Meets the requirement	Meets the requirement	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 as the rear track width of the tractor is less than 1150 mm.		Not applicable
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	--	--	Did not meet the requirement	Meets the requirement	Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	--	--	Did not meet the requirement	Does not meet the requirement	No
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)	--	--	Meets the requirement	Meets the requirement	Yes



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1	2	3	4	5 a	5 b	6 a	6 b	7
g)	Specifications of Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	--	--	Not fitted	Not fitted	Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gear, (kmph)	Evaluative	Should not exceed 20 kmph	--	--	Conforms	4.62 kmph (Meets the requirement)	Yes
	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. The safety aspects about the operation of shuttle technology shall be brought in operation and manufacturer/dealer shall ensure the training on this aspect to operator before the delivery of tractor.	--	--	Not applicable	Not applicable	Not applicable
7.1.6 Labelling of tractors (Provision of labelling plate):								
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW and year of manufacture in numerical form. MM YY Digit 01 - 12 in box No.1 for MM will represent the months and next two digits in box No.2 for YY will represent the year of manufacturing.	CAPTAIN		Yes		
	2) Model	Evaluative		280 4WD		Yes		
	3) Year of manufacture	Evaluative		05/19		Yes		
	4) Engine number	Evaluative		SC21313943		Yes		
	5) Chassis number	Evaluative		D11905346		Yes		
	6) Declaration of PTO power, kW	Evaluative		16.8		Yes		
7.1.7 Literature (Submission to test agency):								
(a)	Operator manual	Evaluative	Provided/Not Provided	Provided	Yes			
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	Provided	Yes			
(c)	Workshop/Service manual	Evaluative	Provided/Not Provided	Provided	Yes			
7.1.8	Fitment of roll Over protective structures (ROPS): for tractor having more than 1150 mm rear track width		ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard	ROPS not fitted	Not applicable			
7.1.9	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.	Provided	Yes			
7.1.10	Accessories (optional)	Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR	Not applicable	Not applicable			



7.2 CATEGORY OF BREAKDOWNS / DEFECTS (as per clause 5.0 of IS:12207-2019) :					
Sl. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the Requirements (Yes/No)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than three and frequency of each should not be more than two.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or (1 major + 4 minor) 5 minor breakdowns.	None	Yes

7.3 Salient Observations:

7.3.1 Laboratory tests:

7.3.1.1 PTO Performance:

- i) The maximum PTO power was recorded as **17.1 kW** against the declaration of **16.8 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **274 g/kWh** against the declaration of **259 g/kWh**, which is within the tolerance limit of IS: 12207-2019.
- iii) The backup torque is **15.7 %** against the minimum requirement of **12 %**, which meets the requirement of IS: 12207-2019.

7.3.1.2 Three point linkage:

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.

7.3.1.3 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.

Longitudinal adjustment of forward and rearward of operator seat's

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) Provision for easy mounting and dismounting of operator should be provided.
- iv) Provision for master shield for PTO shaft.
- v) Provision for differential lock.



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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 for Captain 120 DI, Captain 120 DI 4WD, Captain 250 DI, Captain 250 DI 4WD, Captain 250 DI 4WD+, Captain 280 4WD tractor models.
 - b) Service Manual for Captain 280 4WD tractor model.
 - c) Parts catalogue for Captain 280 4WD tractor model.
- 7.5.1.2 The printed literature supplied with the test sample is in English was found adequate. The literature may be brought out as per IS: 8132-1999 (Reaffirmed in 2014) for the guidance of user and service personnel in national as well as other regional languages.

The results of the tests carried out on variant model "CAPTAIN 280 4WD" have been compared with those on base model "CAPTAIN 250 DI" and found within the limit, as specified in **Indian Standard: 12207-2019**.

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	11 months September, 2019 to July, 2020	No	Total six months taken by manufacturer for supply of spare parts and resolving the problems of noise at operator's ear level.

TESTING AUTHORITY:

**PRAMOD YADAV
AGRICULTURAL ENGINEER**

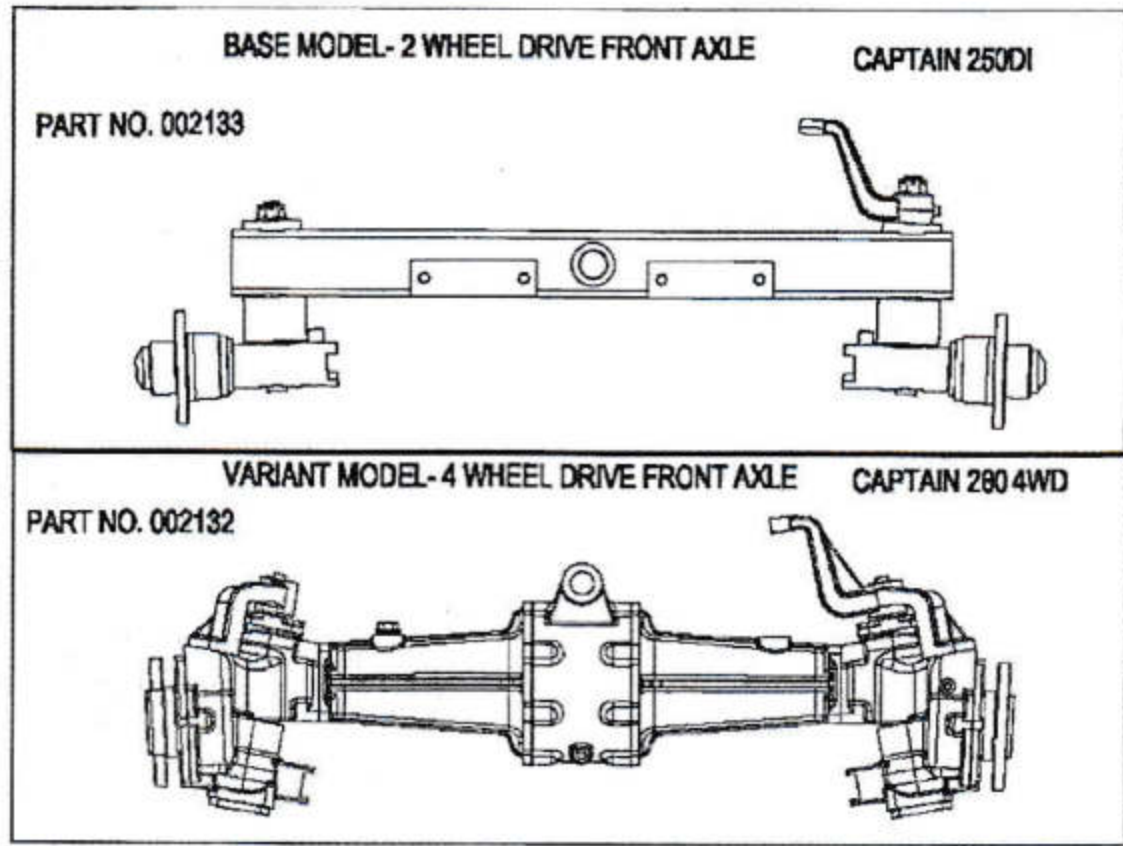
**C.V.CHIMOTE
TEST ENGINEER**

**J.J.R.NARWARE
DIRECTOR**

The report compiled by: Shri Dev Vrat Kumar, **Senior Technical Assistant**.

9. APPLICANT'S COMMENTS

--Nil--

**ANNEXURE-I****ANNEXURE-II****TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	5.7
3.	Drawbar performance test	13.8
4.	Theoretical speed test	2.7
5.	Brake test	1.0
6.	Noise measurement	1.4
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.2
TOTAL:		30.8