

(यह परीक्षण रिपोर्ट 31/01/2025 तक वैध है। / THIS TEST REPORT IS VALID UPTO : 31/01/2025)



SWARAJ,855 FE | 4x4 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, Cooperation & Farmer's Welfare)
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3. ESSENTIAL TEST

3.1. SPECIFICATIONS

3.1.1	Tractor:	<u>Base Model</u>		<u>Variant Model</u>
	Make	:		Swaraj
	Model	:		855 FE 855 FE I 4x4
	Type	:	Four wheeled, Rear wheel drive, Unit Construction, General purpose, Agricultural tractor.	Front / Rear wheel drive (4WD), Standard Agricultural Tractor.
	Month & Year of manufacture	:	November, 2019 (11/19)	August, 2021 (08/21)
	Chassis number	:	MBNBF53AGKCN87266	MBNBF53AKMCK26111
	Country of Origin	:		India
3.1.2	Engine:			
	Manufacturer's address	:	M/s. Swaraj Engines Ltd., Plot No.2, Industrial Area, Phase 9, Mohali, Punjab-160062	
	Make	:	M/s. Swaraj Engines Ltd.	
	Model	:	RB33TR1	
	Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.	
	Serial number	:	50.4001/SAM22721	EZ.5004/SDK33264
	Engine speed (Manufacturer's recommended production setting), (rpm):			
	- Maximum speed at no load	:	2100 to 2200	
	- Low idle speed	:	600 to 700	
	- Speed at maximum torque	:	1000 to 1400	
	Rated speed, (rpm):			
	- For PTO use	:	2000	
	- For drawbar use	:	2000	
3.1.3	Cylinder & Cylinder Head:			
	Number	:	Three	
	Disposition	:	Vertical, inline	
	Bore/stroke, (mm)	:	110/122	
	Capacity as specified by the applicant, (cc)	:	3478.2	
	Compression ratio	:	18.7(±0.5) :1	
	Type of cylinder head	:	Individual	
	Type of cylinder liners	:	Wet, replaceable	
	Type of combustion chamber	:	Direct injection, Re-entrant cavity on piston crown	
	Arrangement of valves	:	Over head, inline	
	Valve clearance (Cold):			
	- Inlet valve, (mm)	:	0.25 - 0.30	
	- Exhaust valve, (mm)	:	0.30 -0.35	
3.1.4	Fuel System:			
	Type	:	Gravity and forced feed	
3.1.4.1	Fuel tank:			
	Capacity, (l)	:	59.6	60.0
	Location	:	Above clutch housing	
	Provision for draining of sediments/ water	:	Provided	Not provided
	Material of fuel tank	:	Metallic	

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: 12207-2019	Values declared by the applicant (D)/ Requirement (R)		As observed		Whether Variant model meets the requirements (Yes/No)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5a	5b	6a	6b	7
7.1.1	PTO Performance:							
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ±5 percent for PTO power and engine power > 26kW. ±10 percent for PTO power and or engine ≤ 26 kW.	33.8 (D)	33.8 (D)	33.8	32.7	Yes
b)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 %	257 (D)	257 (D)	249	264	Yes
7.1.2	Drawbar performance :							
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70 percent of static mass with ballast	21.83 (D) 21.60 (R)	23.75 (D) 23.51 (R)	25.23	29.93	Yes
b)	Max. drawbar pull with unballast, as the case may be corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Evaluative	Minimum 70 percent of static mass of tractor without ballast or with standard ballast, as the case may be	14.60 (D) 14.60 (R)	16.75 (D) 16.51 (R)	17.91	22.09	Yes
c)	Maximum drawbar power with unballast 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.	28.5 (D) 27.0 (R)	27.0 (D) 26.2 (R)	28.4	29.4	Yes
d)	Max. transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	110 (D)	80	64	Yes

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1	2	3	4	5a	5b	6a	6b	7
7.1.3	Noise Measurement :							
a)	Maximum ambient noise emitted by the tractor at bystanders position, dB(A)	Evaluative	88 dB(A) for >1.5 tonne GVW and 85 dB(A) for <1.5 tonne GVW (as per CMVR)	88 (R)	88 (R)	84	88	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	96 (R)	95	94	Yes
7.1.4	Safety features:							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part-2))	Meets the requirement			Yes	
b)	Lighting arrangement	Evaluative	As per CMVR			Meets the requirement	Yes	
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343-1998			Meets the requirement	Yes	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)			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)			Does not meet the requirement	No	
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS:12953-1990			Meets the requirement	Yes	
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement of IS: 12362 (Part 3) (As amended from time to time)			Not fitted	Not applicable	
h)	1) Maximum travelling speed at rated engine speed in reverse gear, (kmph)	Evaluative	Should not exceed 20 kmph			12.92 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

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1	2	3	4	5a	5b	6a	6b	7
7.1.5	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.		Swaraj		Yes
	2)	Model	Evaluative			855 FE I 4x4		Yes
	3)	Month & Year of manufacture	Evaluative			08 / 21		Yes
	4)	Engine number	Evaluative			EZ.5004/SDK33264		Yes
	5)	Chassis number	Evaluative			MBNMG53AKMCK26111		Yes
	6)	Declaration of PTO power, kW	Evaluative			33.8		Yes
7.1.6	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
7.1.7		Fitment of Roll Over Protective Structures (ROPS): for tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard		ROPS not fitted		Not applicable
7.1.8		Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.		Provided		Yes
7.1.9		Accessories (optional)	Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR		Provided		Yes
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) or 5 minor breakdowns.			None	Yes	

7.3 Salient Observations:

7.3.1 Laboratory tests:

7.3.1.1 Three point linkage:

- Lateral distance from lower hitch point to centre line of tractor does not meet the requirements of IS: 4468- (Part-1) -1997 (Reaffirmed in Oct., 2017). This should be looked into for necessary corrective action.
- Some of the parameters conform to Cat. I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

7.4 Maintenance / Service Problems:

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

7.5 Recommendation with regard to safety on tractor:

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

- The fuel shut Off knob should be provided as per IS: 8133-1983 (Reaffirmed in January, 2019).
- Provision of differential lock.
- The spark arrester in the exhaust system should be provided as per IS: 12239 (Part-1)-2018.

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- iv) Vertical retainer should be provided on inner side of clutch pedal as per IS: 12239 (Part-1)-2018.
- v) Width of foot step does not meet the requirement of IS: 12239 (Part-1)-2018. This should be provided as per the above referred standards.
- vi) The working clearance between the draft control lever and position control lever should be provided as per the requirement of IS: 12239 (Part-2) - 1999, (Reaffirmed in January, 2019).
- vii) PTO master shield should be provided on tractor as per IS: 4931-1995 (Reaffirmed in January, 2019).
- viii) The actuating force for hand lever operated hydraulic power lift was observed **93N** against the requirement **70N** & does not meet the requirement of IS: 10703-1992. This should be provided as per the above referred standards.

7.6 Adequacy of Literature supplied with machine:

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

- a) Service Manual of Swaraj 855 FE I 4x4 tractor model.
- b) Parts Catalogue of Swaraj 855 FE I 4x4 tractor model.
- c) Operator's manual of Swaraj 855 FE I 4x4 tractor model.

7.6.2 The operator manual may be brought out for the guidance of users and service personnel as per IS:8132-1999 incorporating, inter alia, the following:

- 1. Operator manual shall have its own part number and date of issue.

The results of the tests carried out on variant model "**Swaraj 855 FE I 4x4**" tractor have been compared with those on base model "**Swaraj 855 FE**" tractor tested vide test report No. **T-1121/1647/2017 (December, 2017)**, Administrative Extension report vide test report No. **T-1348/1875//2020 (March, 2020)** & Technical Extension report vide test report No. **T-1461/1988/2020 (July, 2020)** which was found within the limit as specified in IS: 12207-2019.

TESTING AUTHORITY:

C.V.CHIMOTE TEST ENGINEER	
P. K. PANDEY DIRECTOR	

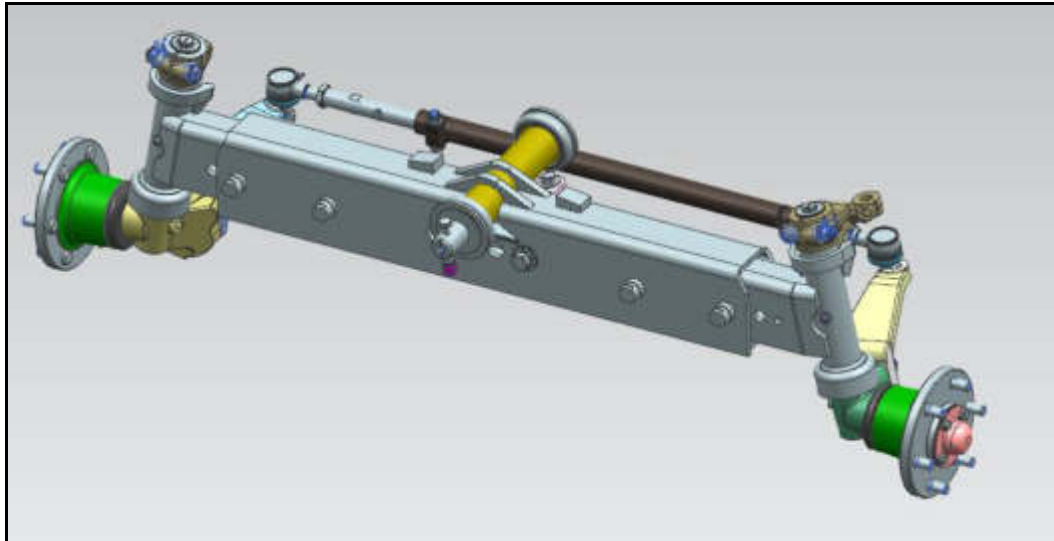
Draft test report is compiled by: Shwetabh Singh, Agricultural Engineer.

8. APPLICANT'S COMMENTS

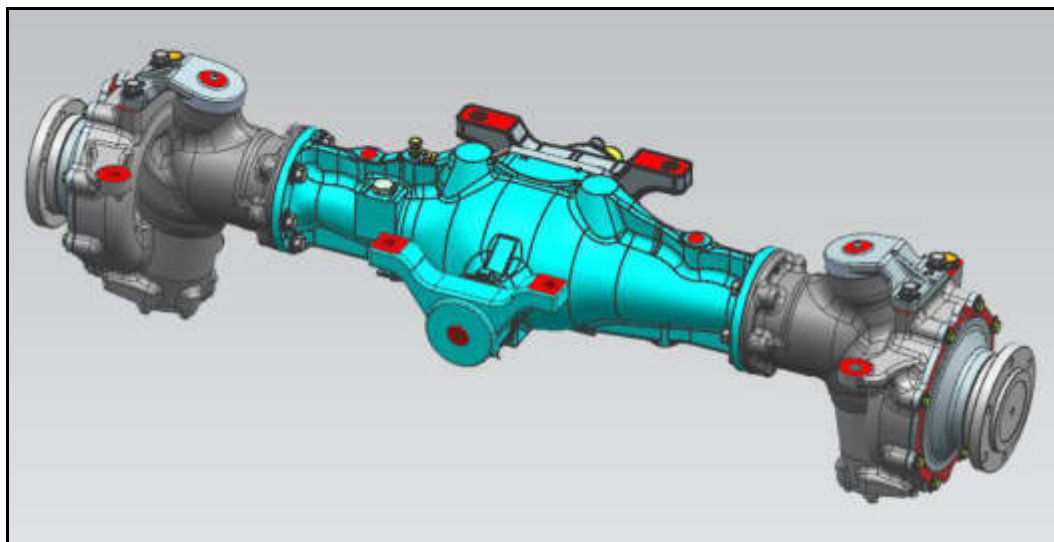
Para No.	Our Reference	Applicant's comments
8.1	7.3.1.1 & 7.5	These requirements are being revisited for necessary corrective action at our end.

ANNEXURE-I

FRONT AXLE DESIGN ON BASE MODEL SWARAJ 855 FE



FRONT AXLE DESIGN ON VARIANT MODEL SWARAJ 855 FE | 4x4



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ANNEXURE- II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	<u>HOURS</u>
1.	Running-in	60.0
2.	PTO performance test under natural ambient condition	3.2
3.	Drawbar performance test	18.0
4.	Noise measurement	1.5
5.	Turning ability	0.4
6.	Location of Centre of Gravity	0.1
7.	Nominal speed test	2.4
B.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	2.3
TOTAL		87.9