

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 30/11/2024 तक वैध है। / THIS TEST REPORT IS VALID UPTO: 30/11/2024)



SWARAJ, 733 FE 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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2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.827 g/cc at 15°C was used.

2.2 Lubricants:

S.No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Air Cleaner oil	SAE 30	As recommended
2.	Engine oil	SAE 20W40	As recommended
3.	Transmission, Hydraulic and brake systems oil	ELF 2371	Oil originally filled in the tractor was not changed
4.	Grease	Servo grease MP	Servo grease MP

3. ESSENTIAL TEST

3.1. SPECIFICATIONS

3.1.1 Tractor:		<u>Base Model</u>	<u>Variant Model</u>
Make	:	Swaraj	Swaraj
Model	:	834 XM PXPDS 540	733 FE
Brand name, if any	:	Swaraj	
Type	:	Four wheeled, Rear-wheels driven, Unit construction, General purpose, Agricultural Tractor.	
Month & Year of manufacture	:	01/20	08/21
Chassis number	:	MBNAG46ABLT A67271	MBNBZ46AAMTK00004
Country of Origin	:	India	
3.1.2 Engine:			
Make	:	M/s Swaraj Engine Ltd.	
Model	:	RV30XM +3A	
Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.	
Serial number	:	33.1008/SBA00130	33.1008/SDK04716
Engine speed (Manufacturer's recommended production setting), (rpm):			
- Maximum speed at no load,	:	1900 to 2000	
- Low idle speed	:	580 to 700	
- Speed at maximum torque	:	1000 to 1400	
Rated speed, (rpm):			
- For PTO use	:	1800	
- For drawbar use	:	1800	
3.1.3 Cylinder & Cylinder Head:			
Number	:	Three	
Disposition	:	Vertical, inline	
Bore/stroke, (mm)	:	100/110	
Capacity as specified by the applicant, (cc)	:	2592	
Compression ratio	:	20.4±0.5 : 1	
Type of cylinder head	:	Monoblock	
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 to 0.30	
- Exhaust valve, (mm)	:	0.30 to 0.35	

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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/ requirement		As observed		Whether Variant model meets the requirements (Yes/No)
				<u>Base model</u>	<u>Variant Model</u>	<u>Base model</u>	<u>Variant model</u>	
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.	20.6 (D)	20.6 (D)	20.6	21.5	Yes
b)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 %	272 (D)	272 (D)	248	238	Yes
7.1.2	Safety features:							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part2)	--	--	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 (As amended from time to time)	--	--	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 (As amended from time to time)	--	--	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 Provided	--	Not applicable

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1	2	3	4	5a	5b	6a	6b	7	
h)	1)	Maximum travelling speed at rated engine speed in reverse gears, Kmph	Evaluative	Should not exceed 20 Kmph	--	10.53 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	
7.1.3 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. <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>MM</td><td>YY</td></tr></table> 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.	MM	YY	SWARAJ		Yes
	MM	YY							
	2)	Model	Evaluative		733 FE		Yes		
	3)	Month & Year of manufacture	Evaluative		08 & 21		Yes		
	4)	Engine number	Evaluative		33.1008/SDK04716		Yes		
	5)	Chassis number	Evaluative		MBNBZ46AAMTK000 04		Yes		
6)	Declaration of PTO power, (kW)	Evaluative	20.6		Yes				
7.1.4 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			
7.1.5	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			
7.1.6	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes			
7.1.7	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes			

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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 requirement (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 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 **21.5 kW** against the declaration of **20.6 kW**, which meets the evaluative requirement of IS: 12207-2019.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **238 g/kWh** against the declaration of **272 g/kWh**, which meets the evaluative requirement of IS: 12207-2019.

7.4 Maintenance / Service problems:

No noticeable maintenance and service problems 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:

- i) Vertical distance of SIP to centre of clutch & brake pedal should be provided as IS: 12343-1998 (Reaffirmed in:2019).
- ii) Provision of master shield has should be provided as IS: 12239 (Part-II) (Reaffirmed in 2019).
- iii) Fuel shut-off knob should remains in “STOP” position as per the requirement of IS:8133-1983 (Re-affirmed in 2014).
- iv) Working clearance in between position control and draft control lever is should be provided as per IS: 12239 (Part-II) (Reaffirmed in 2019).
- v) Spark arrester should be provided in the exhaust system as per the requirement of IS:12239 (Part-2)-1999 (Re-affirmed in January, 2019).
- vi) Differential lock should be provided as per the requirement of IS:12239 (Part-2)-1999 (Re-affirmed in January, 2019).

7.6 Adequacy of Literature:




7.6.1 The following literatures were supplied with the test tractor for reference during the test: -

- a) Operator’s manual of SWARAJ 733 FE tractor.
- b) Parts catalogue of SWARAJ 733 FE tractor.
- c) Service Manual of SWARAJ 733 FE tractor.

7.6.2 The literature should be brought out in national as well as other regional languages of India for guidance of users.

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TESTING AUTHORITY:

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

Test Report is compiled by: **Pratyush Satya**, Senior Technical Assistant.

8.0 APPLICANT'S COMMENTS

Para no.	Our reference	Applicant comments
8.1	7.5	These requirements are being revisited for necessary corrective action at our end.

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ANNEXURE -I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	<u>HOURS</u>
1.	Running-in	60.0
2.	PTO performance test	3.6
4.	Nominal speed test	0.8
B	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	0.5
TOTAL:		64.9