

व्यावसायिक - प्रशासनिक विस्तार परीक्षण रिपोर्ट  
COMMERCIAL – ADMINISTRATIVE  
EXTENSION TEST REPORT

संख्या/No. : T-1907/2438/2024  
माह/Month : November, 2024

Application Reference No. 28/2024-25/71



**Make of Agricultural Tractor : SWARAJ**  
**Model : 724 XM ORCHARD**  
**Manufactured by : M/s. Mahindra & Mahindra Ltd.,**  
**Farm Equipment Sector - Swaraj Division,**  
**Phase-IV - Industrial Area, S.A.S. Nagar**  
**Mohali, Punjab- 160 055**



भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय  
(कृषि एवं किसान कल्याण विभाग)

**GOVERNMENT OF INDIA**  
**MINISTRY OF AGRICULTURE AND FARMERS WELFARE**  
**(DEPARTMENT OF AGRICULTURE & FARMERS WELFARE)**

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**IMPORTANT INFORMATION**

This Test Report is an Administrative Extension of its Base Model “Swaraj 724 XM ORCHARD” which had undergone Batch Test (1<sup>st</sup> Batch) & Administrative Extension at this Institute, bearing test report No T-1179/1706/2018 released in August, 2018 & T-1400/1927/2020 released in march, 2020 respectively.

The firm has made changes in said tractor “Swaraj 724 XM ORCHARD” as stated under para 1 of this report and requested vide online application No. 28/2024-25/71 dated 22.08.2024 for Administrative Extension test, which was allowed vide clause no. 3.2.4 of IS: 12207 – 2022.

The applicant vide letter number SD/Budni/Admin/24-25/724XMORCHARD/A-01/L-01 dated 19.11.2024 has informed that the last cut-off chassis number and engine serial number of tractor model “Swaraj, 724 XM ORCHARD” generated on production line is as under:

Chassis Number	Engine Serial Number
MBNAA44AAPTH12955	38.1365/SFH05392

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## 2. ESSENTIAL TESTS

## 2.1 BRIEF SPECIFICATIONS OF TRACTOR

The following are the brief specification of tractor. However, for detail specifications, the test report no. **T-1179/1706/2018** released in **August, 2018** & **T-1400/1927/2020** released in **March, 2020** should be referred.

**2.1.1 Identification:****2.1.1.1 Denomination**

[C]	Make	:	Swaraj
[C]	Model	:	724 XM ORCHARD
[C]	Type	:	Rear Wheel Drive, Standard Agricultural Tractor
[C]	Month & year of manufacture	:	05/24
[D]	Country of origin	:	India

**2.1.1.2 Numbers:**

[D]	1 <sup>st</sup> Serial No. of prototype	:	WQCH12700000596
[C]	Serial No.	:	MBNAA44AARTF16987

**2.1.2 Engine:**

[D]	Manufacturer's address	:	M/s. Swaraj Engines Ltd. Plot no. 2 Industrial Area, Phase -9 Mohali, Punjab - 160062
[C]	Make	:	M/s. Swaraj Engines Ltd.
[C]	Model	:	RV2XM+3A
[C]	Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
[C]	Serial No.	:	38.1365/SGF02633

**2.1.2.1 Cylinders:**

[C]	Number/disposition	:	Two / vertical, in-line
[D]	Bore / Stroke, (mm)	:	100/116
[D]	Capacity, cm <sup>3</sup>	:	1823
[D]	Compression ratio	:	20.4(± 0.5) : 1
[D]	Arrangement of valves	:	Overhead, inline
[D]	Cylinder liners	:	Wet, replaceable
[D]	Type of combustion chamber	:	Re entrant cavity on piston head

**2.1.2.2 Supercharging** : **Not available**

**2.1.2.3 Fuel system:**

[C]	Fuel feed system	:	Gravity and force feed
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**Filter(s):**

[C]	Make	:	Bosch
[C]	Model	:	F002 H20 105
[C]	Type	:	Replaceable element (primary & secondary)
[C]	Number(s)	:	Two
[D]	Capacity of fuel tank, (l)	:	25.0

**Fuel Injection pump:**

[C]	Make	:	Bosch
[C]	Model	:	F002 A0Z 835, PES2A85D320RS3500
[C]	Type	:	Inline, Plunger
[C]	Serial Number	:	66258

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**2.1.7 Labelling of tractor [Refer IS: 10273-1987 (Reaffirmed 2019)]:**

Labelling plate is riveted on **LHS of mudguard** and provides the following information:

Name of Manufacturer	Mahindra & Mahindra Ltd., Swaraj Division Tractors
Make	SWARAJ
Model	724 XM ORCHARD
Month & Year of manufacture	05/24
Engine Serial Number	38.1365/SGF02633
Chassis Serial Number	MBNAA44AARTF16987
Maximum PTO Power, kW	15.9
Specific fuel consumption, g/kWh	275

**3. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS**

**3.1** The performance results have been reproduced from Batch Test Report of “Swaraj, 724 XM ORCHARD” tractor model bearing test report No. **T-1179/1706/2018** released in **August, 2018** & administrative extension report number **T-1400/1927/2020** released in **March, 2020** respectively. On the basis of test conducted the performance results have been summarized as evaluative (mandatory) / Non-evaluative (Non-mandatory) parameters applicable for Qualifying Minimum Performance criteria as per Clause-4 (Table-1) of **IS: 12207-2022** 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: 12207-2022	Values declared by the applicant/ (D) Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
	MANDATORY TESTS: (As per Ministry’s Office Memorandum No. 13-17/2021-M&T (I&P) dated 28th of July, 2022). (In the ensuing table, ‘D’ stands for applicant’s declaration, whereas ‘R’ stands for requirement as per BIS test code)					
<b>3.1.1</b>	<b>PTO Performance:</b>					
<b>a)</b>	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power and or engine power $>26$ kW. $\pm 10\%$ for PTO power and or engine $\leq 26$ kW.	15.9 (D)	16.1	Yes
<b>b)</b>	Power at rated engine speed, (kW)	Non Evaluative	-do-	15.9 (D)	15.6	Yes
<b>c)</b>	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	Should not be more than 10% of declared value.	275 (D)	249	Yes
<b>d)</b>	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	98 (D)	105.3	Yes
<b>e)</b>	Back-up torque, percent	Evaluative	Should be min. 12%	12 (D) 12 (R) min.	19.4	Yes

1	2	3	4	5	6	7	
f)	Maximum operating temperature, (°C):						
	1)	Engine oil	Evaluative	The declared value should not exceed the Max value specified by the oil company and the observed value under natural ambient/high ambient condition should not exceed the declaration.	130 (D)	116	Yes
	2)	Coolant	Evaluative	Observed value should not exceed the declared value or boiling point of coolant at radiator cap pressure whichever is lower. The boiling point of the coolant at radiator pressure shall be provided by the applicant.	115 (D)	102	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at Max power under natural ambient condition. The value would be based on the test conducted under natural ambient condition	2.57 (R) maximum	2.03	Yes	
h)	Smoke level, m <sup>-1</sup>	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value ( <b>As per CMVR</b> ). Max Smoke level shall be reported out of 6 readings tested as per IS 12062 and observed value should be well within the required limits.	3.25 per meter (R) Maximum	0.23	Yes	
<b>3.1.2</b>	<b>Drawbar performance:</b>						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass of tractor with ballast.	Not applicable		Not applicable	
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	In case of tractors having total static mass ≥ 1500 kg, Min 70% of static mass of tractor without ballast or with standard ballast, as the case may be. In case of light weight tractors having ≤ 1500 kg total static mass of tractor, Min. 65% of static mass of tractor without ballast or with standard ballast, as the case may be.	9.85 (D) 9.85 (R) minimum	11.25	Yes	
c)	Maximum drawbar power with standard 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.	12.2 (D) 12.05 (R) minimum	13.7	Yes	
d)	Maximum transmission oil temperature, (°C)	Evaluative	The declared value should not exceed the recommendation by the oil manufacturer. The observed value should not exceed the declared value throughout the drawbar test.	110 (D)	80	Yes	

1	2	3	4	5	6	7
<b>3.1.3</b>	<b>Power lift and hydraulic pump performance:</b>					
<b>a)</b>	Maximum lifting capacity throughout the range of lift, (kN):					
1)	At hitch points	Evaluative	Should not be less than 90% of declared value.	<b>9.80 (D)</b> 8.82 (R) minimum	13.5 6	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.	<b>6.80 (D)</b> 3.79 (R) minimum	6.80	Yes
<b>b)</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 minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm.	50 (D) maximum	10	Yes
<b>3.1.4</b>	<b>Brake performance at 25 kmph:</b>					
<b>a)</b>	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	8.53	Yes
2)	Hot brake	Evaluative	10	10	8.94	Yes
<b>b)</b>	Whether parking brake is effective at a force of 600 N at foot pedal (s) or 400 N at hand lever	Evaluative	Yes / No	Yes	Yes	Yes
<b>3.1.5</b>	<b>Safety features :</b>					
<b>a)</b>	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes [As per IS 12239 (Part2)]	Conforms		Yes
<b>b)</b>	Lighting arrangement	Evaluative	As per CMVR	Conforms		Yes
<b>c)</b>	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		Not applicable
<b>d)</b>	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Conforms		Yes
<b>e)</b>	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS 17231: 2019 (As amended from time to time)	<b>Does not conform</b>		<b>No</b>
<b>f)</b>	Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)	Conforms		Yes
<b>g)</b>	Swinging drawbar (wherever fitted)	Non 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	5	6		
<b>h)</b>	Audible warning signal on tractor	Evaluative	If tractor travel speed in reverse gear exceeds 20 kmph, an audible warning signal on tractor shall get activated.  A sticker to the effect that “operating the tractor beyond 20 kmph speed in reverse gear is not safe” should be prominently displayed.	Not fitted	Not applicable		
<b>3.1.6</b>	<b>Labelling of tractors (Provision of labeling plate):</b>						
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO in kW, Specific fuel consumption (SFC) corresponding to maximum power in g/kWh and year of manufacture in numerical form <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>MM</td><td>YY</td></tr></table> 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.	MM	YY	<b>SWARAJ</b>	Yes
MM	YY						
	2) Model	Evaluative		<b>724 XM ORCHARD</b>	Yes		
	3) Month & Year of manufacture	Evaluative		<b>05/24</b>	Yes		
	4) Engine number	Evaluative		<b>38.1365/SGF02633</b>	Yes		
	5) Chassis number	Evaluative		<b>MBNAA44AART F16987</b>	Yes		
	6) Maximum PTO power, (kW)	Evaluative		<b>15.9</b>	Yes		
	7) Specific fuel consumption, (g/kWh)	Evaluative	<b>275</b>	Yes			
<b>3.1.7</b>	<b>Literature (Submission to test agency):</b>						
<b>(a)</b>	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 and should submit along with the test sample.	Provided	Yes		
<b>(b)</b>	Parts Catalogue	Evaluative		Provided	Yes		
<b>(c)</b>	Workshop/ Service manual	Evaluative		Provided	Yes		
<b>3.1.8</b>	<b>Fitment of Roll Over Protective Structures (ROPS):</b>						
	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.	Not fitted	Not applicable		
<b>3.1.9</b>	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Yes		
<b>3.1.10</b>	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR	Provided	Yes		



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3.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2022):					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2022	As observed	Whether meets the Requirement (Yes/No)
1.	Critical	Evaluative	There is no 'critical breakdown' during the course of testing.	None	Yes
2.	Major	Evaluative	There are not more than 2 major breakdowns and neither of them should be of repetitive nature.	None	Yes
3.	Minor	Evaluative	There are not more than 5 minor defects during the test and neither of them should of repetitive nature.	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




**Remark:**

- All performance results as mentioned under para 3 of this test report (except clause no. 3.1.3 a 'declared value' & 3.1.6) are taken from base model "Swaraj, 724 XM ORCHARD" bearing test report no. T-1179/1706/2018, August, 2018 & T-1400/1927/2020, March 2020 respectively.
- The parameter highlighted under clause 3.1.3 a 'declared value' & 3.1.6 belong to the tractor under administrative extension.

**3.3 Salient Observations:**

This tractor model meets the evaluative requirement of IS: 12207-2022.

**TEST CARRIED OUT AT C.F.M.T. & T.I., BUDNI (M.P.), INDIA  
TESTING AUTHORITY**

B.N. DIXIT AGRICULTURAL ENGINEER	
P. LODH SENIOR AGRICULTURAL ENGINEER	
Dr. P. P. RAO DIRECTOR	

Draft Test Report compiled by Sh. Dharmendra Kumar, Senior Technical Assistant.

**4. APPLICANT'S COMMENTS**

Para no.	Our reference	Applicant comments
		There are no specific comments received from the applicant on draft test report