

व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच)

संख्या/No. : T-1729/2260/2023

COMMERCIAL TEST REPORT (1st Batch)

माह/Month : May, 2023

Application Reference No. 28/2022-23/56

(यह परीक्षण रिपोर्ट 31/05/2030 तक वैध है / THIS TEST REPORT IS VALID UPTO 31/05/2030)



Make of Agricultural Tractor : SWARAJ
Model : 717 ES
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)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) 466 445

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

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T-1729/2260/2023	SWARAJ, 717 ES TRACTOR– Commercial (1 st Batch)
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IMPORTANT INFORMATION

The Government of India, Ministry of Agriculture and Farmers' Welfare has directed, vide a OM No. 13-17/2021-M&T(I&P) dated 28.07.2022, that since 15th August, 2022, only mandatory tests will be carried out on a tractor unless applicant has expressly requested for optional tests as well, mentioned in the above captioned OM.

In the instant case, there is no request from the applicant to carry out the optional tests hence only Mandatory Tests, as given below, have been conducted and reported in this report:-

1. PTO performance
2. Hydraulic performance
3. Drawbar performance
4. Brake performance

Month: May	Test Report No.: T-1729/2260/2023	Year: 2023
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[C]	Manufacturer	:	M/s. Mahindra & Mahindra Ltd. (Farm Equipment Sector), Swaraj Division, Phase- IV, Industrial Area, S.A.S. Nagar, Mohali, Punjab – 160 055
[D]	Location of other manufacturing plants (apa)	:	M/s. Mahindra & Mahindra Limited (Farm Equipment Sector), Swaraj Division (i) Agri Development Centre, Village: Mehla, Tehsil-Dudu, Jaipur – Ajmer Road (ii) Deepak Diesel Pvt. Ltd. Survey no. 287/1, shaper village main road, Shapar (Veraval), Dist: Rajkot-360024
[C]	Submitted for test by (Applicant)	:	The Manufacturer
[C]	Selected for test by	:	The test sample was selected randomly out of Five tractors from the production line by the representative of testing authority through online mode.

Details of tractors made available for random selection :

		S.No. Chassis Number	
		i)	MBNZMEBXENJH07705
		ii)	MBNZMEBXENJH07706
		iii)	MBNZMEBXENJH07707
		iv)	MBNZMEBXENJH07709
		v)	MBNZMEBXENJH07713
[D]	Place of running-in	:	At manufacturer's works
[D]	Duration of running-in, (h):		
	-Engine	:	15
	-Transmission	:	30
[C]	Location of test	:	Government of India, Central Farm Machinery Training and Testing Institute, P.O. - Tractor Nagar, BUDNI – 466445 (M.P.), INDIA

1. SPECIFICATIONS OF TRACTOR

1.1	Identification:		
1.1.1	Denomination		
[C]	Make of tractor	:	Swaraj
[C]	Model (trade name)	:	717 ES
[C]	Type	:	Rear Wheel Drive, Standard Agricultural Tractor.
[C]	Month & year of manufacture	:	11/22
[D]	Country of origin	:	India
1.1.2	Numbers:		
[D]	1 st Serial No. or prototype	:	MBNZMEBXEJJB00001
[C]	Serial No.	:	MBNZMEBXENJH07709
1.2	Engine:		
[D]	Manufacturer's address	:	M/s. Mahindra & Mahindra Ltd., FES at M/s. Deepak Diesel Pvt. Ltd. Survey no. 287/1, shaper village main road, Shapar (Veraval), Dist: Rajkot- 360024
[C]	Make	:	Mahindra & Mahindra ltd.
[C]	Model	:	MM0863NA014T ES
[C]	Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
[C]	Serial No.	:	GNH6CAA9447

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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) / 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:

S. 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).						
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: $\pm 5\%$ for PTO power and or engine power > 26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW.	8.2 (D)	8.7	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	8.2 (D)	8.7	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	Should not be more than 10% of declared value	280 (D)	274	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	43 (D)	46.0	Yes
e)	Back-up torque, percent	Evaluative	Should be minimum 12 percent	12 (D) 12 (R)	27.1	Yes
f)	Maximum operating temperature, ($^{\circ}$ C):					
	1) Engine oil	Evaluative	The declared value should not exceed the <i>Max</i> value specified by the oil company and the observed value under natural ambient/high ambient condition should not exceed the declaration	130 (D)	93	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.	110 (D)	83	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	The value would be based on the test conducted under natural ambient condition	2.74 Maximum (R)	1.40	Yes
h)	Smoke level, m^{-1}	Evaluative	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 Maximum (R)	0.09	Yes

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1	2	3	4	5	6	7	
7.1.2	Drawbar performance:						
a)	Maximum drawbar pull without ballast or with standard ballast corresponding to 15% wheel slip or 7% track 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.	5.94(D) 5.35 (R) Minimum	6.97	Yes	
b)	Maximum drawbar power without ballast or with standard ballast as the case may be, kW	Evaluative	Min 80% of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg. Min 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. Min 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.	6.15 (D) 6.5 (R) Minimum	7.9	Yes	
c)	For tractors fitted with air conditioned /heated cabin: Maximum drawbar power without ballast, or with standard ballast as the case may be, kW	Evaluative	Min 70% of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 Kg.	Not fitted	Not fitted	Not applicable	
d)	Maximum transmission oil temperature, ($^{\circ}$ C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	75	Yes	
7.1.3	Power lift and hydraulic pump performance:						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Should not be less than 90% of declared value.	7.30 (D)	6.75	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.	4.40 (D) 2.05(R) Minimum	5.24	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 Minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) Maximum	10	Yes	
7.1.4	Brake performance at 25 kmph:						
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal without ballast, (m):						
	1)	Cold brake	Evaluative	10	10 (R)	8.14	Yes
	2)	Hot brake	Evaluative	10	10 (R)	8.38	Yes
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	
7.1.5	OPTIONAL TESTS: As the applicant has not applied for any optional tests, therefore no optional tests was conducted.						

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1	2	3	4	5	6	7		
7.1.6	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)		Not applicable as the rear track width of tractor is less than 1150 mm.	Not applicable		
d)	Technical requirements for PTO shaft	Non 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-1N) (As amended from time to time)		Does not meet the requirement	No		
f)	Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)		Meets the requirement	Yes		
g)	Specifications of 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		
h)	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 provided	Not applicable		
7.1.7	Labelling of tractors (Provision of labelling plate):							
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="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 month and next two digit in the box No. 2 for YY will represent the year of manufacturing	MM	YY		Swaraj	Yes
MM	YY							
2)	Model	Evaluative			717 ES	Yes		
3)	Month & Year of manufacture	Evaluative			11/22	Yes		
4)	Engine number	Evaluative			GNH6CAA9447	Yes		
5)	Chassis number	Evaluative			MBNZMEBXENJH 07709	Yes		
6)	Maximum PTO power, (kW)	Evaluative			8.2	Yes		
7)	Specific fuel consumption, g/kWh	Evaluative		280	Yes			
7.1.8	Literature (Submission to test agency):							
(a)	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)	Parts Catalogue	Evaluative			Provided	Yes		
(c)	Workshop/ Service manual	Evaluative			Provided	Yes		

1	2	3	4	5	6	7
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7.1.9	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:1182 or OECD code or equivalent International Standard	Not fitted	Not applicable
7.1.10	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Yes
7.1.11	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR	Not fitted	Not applicable

7.2	CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2022):				
S. No.	Category of break-downs	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2022	As observed	Whether meets the Requirements (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 break downs 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 be of repetitive nature.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of break downs should exceed five that is, (2major + 3 minor) or (1 major + 4 minor) or 5 minor breakdowns.	None	Yes

7.3 Conformity with following IS:

- i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS:10273 -1987 (Reaffirmed Year 2019)] : **Conforms**
- ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed Year 2019)] : **Conforms**
- iii) Agricultural wheeled tractors – Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS:4468 (Part-2) – 1993 (Reaffirmed in Jan., 2019)] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed Year 2022)] : **Conforms**
- v) Agricultural tractors- Operator's seat technical requirement [IS12343 - 2021] : **Not applicable**
(Tractors rear track width is less than 1150 mm)
- vi) Guide for safety & comfort of operator of agricultural tractors:Part 1 General requirements (first revision):[IS 12239 (Part 1) - 2018] : **Does not conform**
- vii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (Part 2) 1999) (Reaffirmed Year 2019)] : **Does not conform**
- viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery [IS: 8133 - 2021] : **Does not conform**
- ix) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays Part2 Symbols for agricultural tractors and machinery [IS: 6283(Part-1) - 2006 (Reaffirmed Year 2019) and IS: 6283 (Part-2) – 2007 (Reaffirmed Year 2019)] : **Conforms**
- x) Agricultural Tractors and Machinery-Lighting device for travel on public roads (IS:14683-1999) (Reaffirmed Year 2019)] : **Conforms**

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7.4 Salient Observations:

7.4.1 Operator's work place:

The following parameters does not meet the requirement of IS: 12239 (Part-I) 2018.

- i) Vertical retainers on inner side of clutch pedal were not provided.
- ii) Spark arresting device has not been provided in the exhaust system.
- iii) Master shield has not been provided.

Therefore, all of the above should be looked into for necessary corrective action.

7.4.2 Three point linkage:

Transport height was recorded as 560 mm against the minimum requirement of 600 mm, and power range was recorded as 410 mm against the minimum requirement of 420 mm, which does not meet the requirements of IS:4468 (Part-2) – 1993.This should be looked into for corrective action.

7.4.3 Maintenance / Service Problems:

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

7.4.4 Recommendation with regard to safety on tractor:

- i) Identification of levers by colour has not been provided as per the requirement as laid down in Table – 5 of IS: 8133-2021.
- ii) There should be provision against accidental start or safety switch.
- iii) The working clearance between draft & position control lever & LHS fender has been measured as 40 mm against the minimum requirement of 70 mm.
- iv) Fuel shut off knob should does not remains in stop as per the requirement of IS: 8133-2021.
- v) Identification of rockshaft (Basic, Up & Down) should be provided as per of IS: 6283 (Part 1&2) – 1998 (Re-affirmed in January, 2019).

Above parameters should be looked into for necessary corrective action.

7.5 Adequacy of Literature supplied with machine:

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

- a) Operator's manual for Swaraj 717 ES tractor model
- b) Part's catalogue of Swaraj 717 ES tractor model
- c) Service manual of Swaraj 717 ES tractor model

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

TESTING AUTHORITY

C. V. CHIMOTE TEST ENGINEER	
A.K. UPADHYAY DIRECTOR (I/C)	

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

8. APPLICANT'S COMMENTS

Para no.	Our reference	Comments
18.1	7.4.1, 7.4.2 & 7.4.4	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:	HOURS
1.	Running-in	Applicant has declared it to be conducted on their work place.
2.	PTO performance test	13.4
3.	Power lift and hydraulic pump performance test	6.8
4.	Drawbar performance test	14.2
5.	Brake performance test	1.0
6.	Nominal speed test	1.3
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test.	0.8
TOTAL:		37.5