

(यह परीक्षण रिपोर्ट 31/08/2023 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 31/08/2023)



GROMAX, TRAKSTAR 550 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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3. ESSENTIAL TEST

3.1. SPECIFICATIONS

	<u>Base Model</u>	<u>Variant Model</u>
3.1.1 Tractor:		
Make	: Gromax	Gromax
Model	: Trakstar 545	Trakstar 550
Type	: Four wheeled, rear-wheels driven, standard agricultural tractor.	
Month & Year of manufacture	: 2017	12 / 19
Chassis number	: M9KATADAAHV00005	M9KATAEDBKVJ01425
Country of Origin	: India	
3.1.2 Engine:		
Make	: Mahindra & Mahindra Ltd.	
Model	: GTS3045NA3A	GTS3048NA3A
Type	: Four strokes, liquid cooled, naturally aspirated, direct ignition, diesel engine.	
Serial number	: NHA6CCE0031	NHA6RAE0030
Engine speed (Manufacturer's recommended production setting), (rpm):		
- Maximum speed at no load	:	2325 to 2525
- Low idle speed	:	750 to 850
- Speed at maximum torque	:	1200 to 1500
Rated speed, (rpm):		
- For PTO use	:	2200
- For drawbar use	:	2200
3.1.3 Cylinder & Cylinder Head:		
Number	:	Four
Disposition	:	Vertical, inline
Bore/stroke, (mm)	:	88.9 / 120
Capacity as specified by the applicant, (cc)	:	2979
Compression ratio	:	21.3 (± 1) : 1 (apa)
Type of cylinder head	:	Monoblock
Type of cylinder liners	:	Wet, replaceable
Type of combustion chamber	:	Re-entrant bowl
Arrangement of valves	:	Over head, inline
Valve clearance (cold/hot)	:	
- Inlet valve, (mm)	:	0.3 to 0.4
- Exhaust valve, (mm)	:	0.4 to 0.5
3.1.4 Fuel System:		
Type	:	Gravity and force feed
3.1.4.1 Fuel tank:		
Capacity, (l)	: 55.0	50.0
3.1.4.2 Water separator	:	Not provided
3.1.4.3 Fuel feed pump:		
Make	:	Bosch, India
Type	:	Plunger
Model/Group combination No.	:	FP/KSG22AD105, F002 A50 040
Provision of sediment bowl	:	Provided
Method of drive	:	Through camshaft of fuel injection pump



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)
				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 > 26 kW. ±10 percent for PTO power and or engine ≤ 26 kW.	29.0 (D)	32.2 (D)	27.7	32.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	29.0 (D)	32.2 (D)	27.7	32.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 %	190 (D)	258 (D)	258	261	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	173 (D)	180 (D)	166.3	179.1	Yes
e)	Back-up torque, percent	Evaluative	12 % Minimum	12 % (R) Minimum	12 % (R) Minimum	38.5	28.8	Yes
f)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR).	3.25 per meter Maximum (R)	3.25 per meter (R)	0.37	0.32	Yes



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1	2	3	4	5a	5b	6a	6b	7
7.1.2	Safety features:							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part2))	Provided		Meets the requirements		Yes
b)	Lighting arrangement	Evaluative	As per CMVR	Provided		Meets the requirements		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)	Did not conform		Does not meets the requirements		No
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Conformed		Meets the requirements		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 conform		Does not meets the requirements		No
f)	Specifications of linkage	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)	Conformed		Meets the requirements		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 Provided		Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gear, (kmph)	Evaluative	Should not exceed 20 kmph	Conformed		12.42 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



1	2	3	4	5a	5b	6a	6b	7
7.1.3	Labelling of tractors (Provision of labelling plate):					Gromax Agri Equipment Limited		Yes
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW and year of manufacture in numerical form. <div style="border: 1px solid black; padding: 2px; display: inline-block;">MM YY</div> 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.			Trakstar 550		Yes
	2) Model	Evaluative				12 / 19		Yes
	3) Month & Year of manufacture	Evaluative				NHA6RAE0030		Yes
	4) Engine number	Evaluative				M9KATAEDBKVJ01425		Yes
	5) Chassis number	Evaluative				32.2		Yes
	6) Declaration of PTO power, (kW)	Evaluative						
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 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
7.1.6	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.			Provided		Yes
7.1.7	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 breakdown	Evaluative	No critical breakdown	None	Yes
2.	Major breakdowns	Evaluative	Not more than two major breakdowns and neither of them of repetitive nature	None	Yes
3.	Minor breakdowns	Evaluative	Not more than five 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 PTO performance test:**

- i) The maximum PTO power was recorded as **32.0 kW** against the declaration of **32.2 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 **261 g/kWh** against the declaration of **258 g/kWh**, which is within the tolerance limit of IS: 12207-2019.
- iii) The maximum equivalent crankshaft torque was recorded as **179.1 N-m** against the declaration of **180 N-m**, which is within the permissible limit as specified in IS: 12207-2019.
- iv) The backup torque is **28.8 %** and meets the evaluative requirement of IS: 12207-2019.

7.3.1.2 Operator's seat:

Longitudinal adjustment of operator seat forward and reverse from mid position. Does not meet the requirement of IS: 12343-1998 (Re-affirmed in 2014). This is recommended to look into for necessary corrective action.

7.3.1.3 Three point linkage:

Lateral distance from lower hitch point to centre line of tractor (lower link in horizontal position) does not meet the requirement of IS: 4468 (part-1):1997 (Reaffirmed in Oct., 2017). This may be looked into for necessary corrective action.

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:

- i) Vertical retainers on both side of clutch pedal should be provided.
- ii) There should be provision for safety against the accidental start.
- iii) The fuel shut-off knob should remain in stop position.
- iv) PTO shaft master shield should be provided.
- v) Working clearance between draft control lever and RHS fender is less than the minimum requirement.
- vi) Vertical distance from seat index point to the centre of clutch pedal is less than the minimum requirement.
- vii) Vertical distance from seat index point to the centre of brake pedal is less than the minimum requirement.
- viii) Longitudinal distance from seat index point to the centre differential lock pedal is less than the minimum requirement.
- ix) Longitudinal distance from seat index point to the centre of steering control wheel is less than the minimum requirement.

7.6 Adequacy of Literature supplied with machine:

7.6.1 The following literature has been supplied with the tractor

- i) Operator manual of Trakstar 531, Trakstar 536, Trakstar 540, Trakstar 545 & Trakstar 550 tractor models.
- ii) Parts catalogue of Trakstar of Trakstar 531, Trakstar 536, Trakstar 540, Trakstar 545 & Trakstar 550 tractor models.
- iii) Service Manual of of Trakstar 531, Trakstar 536, Trakstar 540, Trakstar 545 & Trakstar 550 tractor models.

7.6.2 The supplied literature was found adequate; except the following

- i) Oil grade recommended in operator's manual for steering system; transmission and hydraulic system do not match with specifications submitted by applicant. This should be looked into. The oil change period for the steering system is not mentioned in the operator's manual.



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- ii) Service schedule for engine oil, steering system, transmission and hydraulic system given in operator's manual does not match with specifications submitted by applicant. This calls for necessary corrective action.
- iii) The oil change period for the transmission system in base model is mentioned as 1000 operation hours while the same is mentioned as 1300 operation hours for variant model keeping the same grade of transmission oil in base and variant model. This should be looked into for corrective action.

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

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	02 Months (June, 2020 to July, 2020)	Yes	--None--

TESTING AUTHORITY:

NITESH KUMAR VERMA
AGRICULTURAL ENGINEER

C.V. CHIMOTE
TEST ENGINEER

J.J.R. NARWARE
DIRECTOR

The report compiled by: Shri Pratyush Satya, Senior Technical Assistant

9. APPLICANTS COMMENTS

Para No.	Our reference	Applicant's comments
9.1	7.3.1.2, 7.3.1.3, 7.5, 7.6.2 & 7.6.3	Observation will be studied and necessary action will be incorporated.

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ANNEXURE- I

TRACTOR RUN HOURS DURING TEST

A. LABORATORY AND TRACK TESTS		HOURS
1.	Nominal speed test	0.75
2.	PTO performance test	6.67
3.	Turning Ability and steering effort	0.35
4.	Location of centre of gravity	0.10
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	0.45
Total		8.32