

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: COMB- 228/2661/2021,
माह/Month : February, 2021

THIS TEST REPORT VALID UP TO : 29th February, 2028



**MAHINDRA, HARVEST MASTER 7007 CRW,
SELF PROPELLED PADDY COMBINE HARVESTER
(TRACK TYPE)**



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि, सहकारिता एवं किसान कल्याण विभाग

Department of Agriculture, Cooperation and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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16. FIELD TEST

16.1 The combine harvester was operated in field for a total of 52.40 hours (excluding run in 1.15 h) for paddy harvesting. It took two days of operation for field settings/ adjustments of the machine. During the test, available varieties of crop were harvested to assess the field performance of combine with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction etc. The crop and atmospheric conditions during field test are given in

Appendix - II

The crop parameters recorded during the test for paddy crops is as under:-

Crop Parameters

Sl. No.	Parameters	Observations	
		Paddy	
1.	Average plant height, cm	:	97 to 132
2.	Average number of tillers/m ²	:	209 to 340
3.	Average length of ear head, cm	:	22 to 30
4.	Average straw/grain ratio	:	1.3 to 2.3
5.	Average moisture, %:		
	- Grain	:	12.0 to 18.0
	- Straw	:	57.6 to 68.4

The summary of losses and efficiencies observed during field performance test with paddy crop is summarised in Table 4 and presented in detail in Appendix - III

TABLE-10: SUMMARY OF LOSSES & EFFICIENCIES OBSERVED IN FIELD PERFORMANCE TEST.

Crop variety	Collect-able losses (%) (Max.)	Non-collect-able losses (%) (Max.)	Total processing losses (%) (Max.)	Threshing efficiency (%) (Min.)	Cleaning efficiency (%) (Min.)	Forward speed (kmph)	Area covered (ha/h)	Fuel consumption		Grain out put (kg/h)	Crop through-put (t/h)
								l/h	l/ha		
1	2	3	4	5	6	7	8	9	10	11	12
Paddy											
NDR 359	1.9	0.4	2.0	98.3	97.2	2.82 to 3.46	0.367 to 0.530	6.68 to 8.16	13.72 to 19.38	2810.88 to 4004.65	7.6 to 9.3
Pusa 44	1.8	0.4	1.9	98.2	97.7	2.63 to 3.08	0.319 to 0.406	5.42 to 7.80	16.97 to 20.24	3491.08 to 3790.35	9.4 to 10.7

16.2 Unloading of grains

The time to unload the grain tank ranged from 68 to 98 seconds in Paddy operation.

16.3 Time required for daily maintenance

The average labour required for daily maintenance was approximately one man hours.

16.4 Harvesting of any other crop

Not done, as not recommended.

17. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

During the field performance test SMS rotor flange welding cracked.

18. INSPECTION AND ASSESSMENT OF WEAR

	The engine and other assemblies were dismantled after 67 hours of engine operation.						
18.1	Engine						
18.1.1	Cylinder bore						
Cylinder No.	Cylinder bore dia. (mm)						Max. permissible wear limit (mm)
	Top position		Middle position		Bottom position		
	Thrust side	Non-thrust side	Thrust side	Non-thrust side	Thrust side	Non-thrust side	
1.	98.00	98.00	98.00	98.00	98.00	98.00	98.13
2.	98.00	98.00	98.00	98.01	98.01	98.01	
3.	98.00	98.00	98.00	98.01	98.01	98.00	
4.	98.00	98.00	98.00	98.01	98.01	98.00	

18.1.2 Piston

Piston No.	Piston dia. (mm)				Clearance between cylinder liner and piston (mm)	
	Top position		At skirt			
	Thrust side	Non-thrust side	Thrust side	Non-thrust side	Observed	Discard Limit
1.	97.45	97.36	97.93	Not measured due to piston design constraint	0.1	0.1175
2.	97.43	97.36	97.91			
3.	97.43	97.36	97.92			
4.	97.43	97.36	97.92			

19. SUMMARY OF OBSERVATIONS

19.1 Engine Performance Test:

Brake Power KW	Engine speed (rpm)	Fuel consumption			Specific energy, kWh/l
		l/h	kg/h	Specific, kg/kWh	
(1)	(2)	(3)	(4)	(5)	(6)
i) Maximum power – Two hour test:					
52.9	2499	14.3	11.8	0.224	3.7
ii) Power at rated engine speed: (2600 rpm)					
52.9	2500	14.4	11.9	0.225	3.7

Table2- : ENGINE TEST (HIGH AMBIENT)

Brake Power (kW)	Engine speed (rpm)	Fuel consumption			Specific energy, kWh/l
		l/h	kg/h	Specific, kg/kWh	
(1)	(2)	(3)	(4)	(5)	(6)
a) Maximum power-					
51.4	2499	14.2	11.6	0.225	3.6
b) Power at rated engine speed: (2600 rpm)					
51.4	2499	14.2	11.6	0.225	3.6

19.2 Field Test:

19.2.1 Summary of field tests:

The results of the field test are summarized below:

S. No.	Parameters	Observed Range
		Paddy harvesting
1.	Average speed of operation (kmph)	2.63 to 3.46
2.	Average area covered (ha/h)	0.319 to 0.530
3.	Average fuel consumption: - (l/h) - (l/ha)	5.42 to 8.16 13.72 to 20.24
4.	Average crop throughput (tonne/h)	7.6 to 10.7
5.	Average of maximum grain breakage in main grain outlet (%)	0.53
6.	Average of maximum header losses (%)	0.37
7.	Average of maximum total non-collectable losses (%)	0.4
8.	Average total collectable losses (%) (un threshed + broken from main outlet)	1.9

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9.	Average of maximum total processing losses (%)	2.0
10.	Average of minimum threshing efficiency (%)	98.3
11.	Average of minimum cleaning efficiency (%)	97.2
12.	Performance of SMS	
	- Uniformity of straw spread, CV (%)	13.2
	- Weight mean size of chopped straw, cm	9.1

19.3 Conformity to Indian Standard

- (i) IS: 6025-1982 (Reaffirmed 2014)-Specification for : **Does not conform in toto**
knife section for harvesting machine.
- (ii) IS: 6024-1983 (Reaffirmed 2014)-Specification for : **Does not conform in toto**
guards for harvesting machines.
- (iii) IS: 10378-1982 (Reaffirmed 2016)-Specification of : **Does not conform in toto**
knife back for harvesting machine.
- (iv) IS: 6283 (Part-I)-2006 & IS: 6283 (Part-II) (Reaffirmed : **Conforms**
2014)-Tractor and machinery for agriculture and forestry, powered lawn and garden equipment-symbol for operator controls and other displays.
- (v) IS: 8133-1983 (Reaffirmed 2014)-Guidelines for : **Conforms**
location & operation of operator controls on agricultural tractors and machinery.
- (vi) IS: 15806-2018 (Combine Harvester recommendation : **Does not conform in toto**
on selected performance and other characteristics)

20. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS AS PER O.M.

S. No	Characteristics	Category (Evaluative/Non evaluative)	Requirement Declaration	Tolerance	Observed	Remarks
1	2	3	4	5	6	7
I. Prime mover performance						
a)	Max. Power (absolute) Average max. Power observed during 2 hrs. Max. Power test in natural ambient condition, kW	Evaluative	50.7	±5% of declared value	52.9	Conforms
b)	Max. Power observed during test after adjusting the no load engine speed as per recommendation of the manufacturer for field work, kW	Evaluative	50.7	±5% of declared value	52.9	Conforms
c)	Power at rated engine speed, kW (under natural ambient condition)	Non-evaluative	50.7	±5% of declared value	52.9	Conforms

XVII. Break down (critical, major & minor)

Sr. No.	Category of breakdowns	Category (Evaluative/ Non evaluative)	Requirements as per OM	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 five and frequency of each should not be more than two	01 No. Min- 89	Yes
4.	Total breakdown	Evaluative	In no case total no of (major + minor) breakdowns exceed five	1 No. Min- 89	Yes

21. CRITICAL TECHNICAL SPECIFICATIONS

Deferred till 31.03.2021 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 22.12.2020.

22. COMMENTS AND RECOMMENDATIONS**22.1 Mechanical vibration**

The amplitude of mechanical vibration of components marked as (*) in chapter 12 of this test report are observed on higher side. This calls for providing suitable remedial measures to dampen the vibration in order to improve the operational comfort and service life of various components & sub-assemblies.

22.2 Field performance test

During the field performance test SMS rotor flange welding was cracked. It MUST be looked into for corrective action.

22.3 Ease of operation and safety provisions

- i) No noticeable difficulties observed during operation of combine harvester.
- ii) First aid box is not provided on machine. It may be provided.
- iii) **Drive safety arrangement (slip clutch) is not provided in undershot conveyor drive. It Should be provided.**

22.4 The SMS rotor shaft is unbalanced. It MUST be looked into for corrective action.**22.5** There is no drive safety for reel assembly, grain conveying auger & grain unloading auger. It should be provided

22.6 Hardness and chemical composition

Hardness & chemical composition of knife blade and knife guard are not within the limit specified in relevant standards. It should be looked into for corrective action at regular production level.

22.7 Literature supplied with the machine.

The following literatures are provided by the applicant during the test.


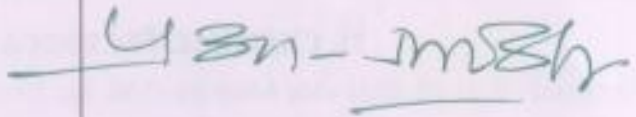
The operator manual

Spare part catalogue

Service manual

However, therefore the same needs to update as per IS: 8132-1999.

TESTING AUTHORITY

SANJAY KUMAR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

Draft test report compiled by Manoj Sharma (B. Tech. Ag. Engg.)

23. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's Comments
23.1	22.1, 22.2, 22.3 , 22.4, 22.5 & 22.6	We will take care in production machines.

