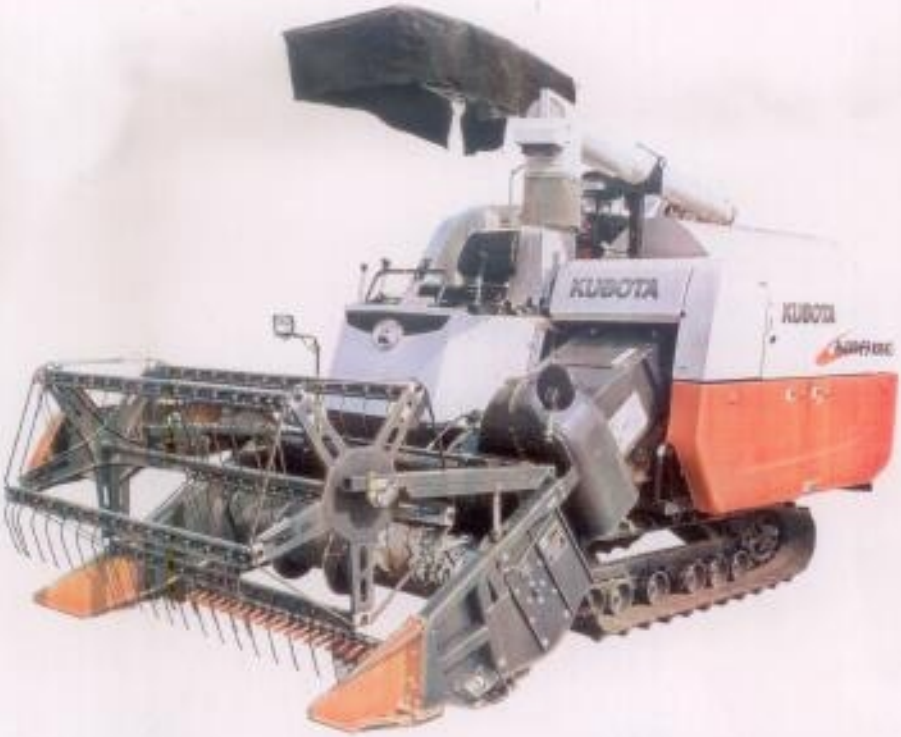
व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ **No.: COMB-230/2663/2021**

माह/**Month : February, 2021**

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



KUBOTA, DC-68G HARVESKING2 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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15. FIELD TEST

15.1 The combine harvester was operated in field for 55.17 hours (excluding run in 1.73 h) for paddy harvesting respectively. 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 wheat crops is as under:-

Crop Parameters

Sl. No.	Parameters		Observations
			Paddy
1.	Average plant height, cm	:	100.0 to 120.6
2.	Average number of tillers/m^2	:	256 to 330
3.	Average length of ear head, cm	:	24.2 to 26.8
4.	Average straw/grain ratio	:	1.3 to 2.5
5.	Average moisture, %:		
	- Grain	:	11.5 to 17.0
	- Straw	:	57.2 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-4: 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 throu gh-put (t/h)
								l/h	l/ha		
1	2	3	4	5	6	7	8	9	10	11	12
Paddy											
PB67	2.0	0.8	2.3	98.3	97.8	3.58	0.435	7.27	16.70	2915.01	6.68
NDR 359	1.4	0.4	1.6	98.5	97.5	3.13 to 3.35	0.426 to 0.446	6.56 to 7.30	15.31 to 16.37	2585.15 to 4541.89	6.55 to 9.94
Pusa44	0.8	0.4	0.9	99.2	98.3	2.77 to 3.32	0.324 to 0.393	6.72 to 7.34	17.10 to 22.66	3410.27 to 3897.14	10.55 to 11.94

15.2 Unloading of grains

The time to unload the grain tank ranged from 65 to 105 seconds in paddy operation.

15.3 Time required for daily maintenance

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

15.4 Harvesting of any other crop

Not done, as not recommended.

16. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

No noticeable defect or breakdown was observed during the test.

17. INSPECTION AND ASSESSMENT OF WEAR

The engine and other assemblies were dismantled after 70.03 hours of engine operation.

17.1 Engine

17.1.1 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.	87.02	87.0	87.01	87.0	87.01	87.0	87.17
2.	87.01	87.01	87.01	87.01	87.01	87.01	
3.	87.02	87.01	87.01	87.01	87.01	87.02	
4.	87.02	87.01	87.02	87.01	87.02	87.01	

17.1.2 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.	86.56	86.49	86.93	Not measured due to piston design constraint		0.23
2.	86.54	86.49	86.94		0.08	
3.	86.54	86.47	86.94			
4.	86.54	86.47	86.93			

18. SUMMARY OF OBSERVATIONS

18.1 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:					
49.1	2700	13.58	11.22	0.228	3.62
ii) Power at rated engine speed: (2700 rpm)					
49.1	2700	13.58	11.22	0.228	3.62

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-					
48.1	2700	13.75	11.25	0.238	3.50
b) Power at rated engine speed: (2700 rpm)					
48.4	2700	13.94	11.40	0.236	3.47

18.2 Field Test:

18.2.1 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)	2.77 to 3.58
2.	Average area covered (ha/h)	0.324 to 0.446
3.	Average fuel consumption: - (l/h) - (l/ha)	 6.56 to 7.34 15.31 to 22.66
4.	Average of maximum crop throughput (tonne/h)	6.55 to 11.94
5.	Average of maximum grain breakage in main grain outlet (%)	0.29
6.	Average of maximum header losses (%)	0.43
7.	Average of maximum total non-collectable losses (%)	0.8
8.	Average of maximum total collectable losses (%) (un threshed + broken from main outlet)	2.0
9.	Average of maximum total processing losses (%)	2.3
10.	Average of minimum threshing efficiency (%)	98.3
11.	Average of minimum cleaning efficiency (%)	97.5

18.3 Conformity to Indian Standard

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

19. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS

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	49.2	±5% of declared value	49.1	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	49.2	±5% of declared value	49.1	Conforms
	c)	Power at rated engine speed, kW (under natural ambient condition)	Non-evaluative	49.2	±5% of declared value	49.1	Conforms

1		2	3	4	5	6	7
	ii)	Knife blade As per IS :6025 - 1982	Non evaluative	It must have Chemical composition as C=0.70-0.95 % Mn= 0.30-0.50%	-	C=0.5936 Mn= 0.3104	**Does not conform** Conforms
	iii)	Knife back should meet the requirement of IS:10378-1982	Non evaluative	The knife back shall be manufactured from Carbon Steel having minimum carbon content of 0.35 %	--	C=0.3566	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	None	Yes
4.	Total breakdown	Evaluative	In no case total no of (major + minor) breakdowns exceed five	None	Yes

20. CRITICAL TECHNICAL SPECIFICATIONS

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

21. COMMENTS AND RECOMMENDATIONS

21.1 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.

21.2 Field performance test

No noticeable defect and breakdown observed during operation of combine harvester.

21.3 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) Unloading auger drive safety is not provided. It should be provided.

21.4 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.

21.5 Literature supplied with the machine.

The following literatures are provided by the applicant during the test as per IS: 8132-1999.

i) The operator manual

ii) Spare part catalogue

iii) Service manual

TESTING AUTHORITY

SANJAY KUMAR AGRICULTURAL ENGINEER	
P. K. PANDEY **DIRECTOR**	

Draft test report compiled by: Abhishek Verma (B.Tech. Ag. Engg.)

22. APPLICANT'S COMMENTS

No Specific comments received from the applicant.