

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: COMB - 273/2870/2022

माह/Month: July, 2022

THIS TEST REPORT VALID UP TO : 31st July, 2029



**PANESAR G-60,
SELF PROPELLED COMBINE HARVESTER**



सत्यमेव जयते

भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि एवं किसान कल्याण विभाग

Department of Agriculture and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

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14. FIELD TEST

14.1 Combine harvester was operated in field for 28.50 and 28.02 (Excluding run-in) hours for wheat and 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 & IV** respectively.

The crop parameters recorded during the test for all crops are as given below:-

Crop Parameters

Sr. No.	Parameters		Observations	
			Wheat	Paddy
1.	Plant height, cm	:	85 to 104	107 to 117
2.	Number of tillers/m ²	:	260 to 310	186 to 244
3.	Length of ear head, cm	:	8 to 10	21 to 25
4.	Straw/grain ratio	:	0.80 to 1.00	0.70 to 1.10
5.	Moisture, %			
	- Grain	:	9.40 to 9.80	13.67 to 13.88
	- Straw	:	5.50 to 8.50	63.40 to 65.20

The results of field performance test of wheat and paddy crops harvesting are summarised in Table – 5 and presented in detail in **Appendix – II to V**.

Table- 5 :SUMMARY OF LOSSES & EFFICIENCIES OBSERVED DURING FIELD PERFORMANCE TEST.

Crop variety	Collectable losses (%) (Max.)	Non-collectable losses (%) (Max.)	Total processing losses (%) (Max.)	Threshing efficiency (%) (Min.)	Cleaning efficiency (%) (Min.)	Grain breakage in main grain tank (Max.) (%) 7	Forward speed (kmph) 8	Area covered (ha/h) 9	Fuel consumption		Grain out put (kg/h) 12	Crop throughput (t/h) 13
									(l/h) 10	(l/ha) 11		
WHEAT												
DPW 222 & 252	1.70	0.40	1.70	99.50	97.80	1.17	1.67 to 1.77	0.361 to 0.381	5.34 to 5.57	14.33 to 15.43	1562.63 to 1760.34	3.01 to 3.33
PADDY												
ND353	2.30	0.20	2.30	99.20	96.80	1.57	1.64 to 1.68	0.240 to 0.288	5.31 to 6.80	18.85 to 24.71	2416.88 to 3913.96	5.43 to 7.00

15. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

No noticeable defect observed during test.

17.3 Conformity to Indian Standard

- (i) IS: 6025-1982 (Reaffirmed 2014)-Specification for knife section : **Does not conform in toto** for harvesting machine.
- (ii) IS: 6024-1983 (Reaffirmed 2014)-Specification for guards for : **Does not conform in toto** harvesting machines.
- (iii) IS: 10378-1982 (Reaffirmed 2016)-Specification of knife back for : **Does not conform in toto** harvesting machine.
- (iv) IS: 6283 (Part I& Part II)-2007(Reaffirmed 2014)-Tractors and : Conforms machinery for agriculture and forestry-symbol for operator controls and other displays.
- (v) IS: 8133-1983 (Reaffirmed 2014)-Guidelines for location & : Conforms operation of operator controls on agricultural tractors and machinery.
- (vi) IS: 15806-2018 (Combine Harvester recommendation on selected : Conforms performance and other characteristics)

18. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS

18.1 Acceptance criteria for performance characteristics as per clause . 4.1 of IS:15806-2018							
Sr. No	Characteristics		Category (Evaluative/Non evaluative)	Requirement (R) Declaration (D)	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	54.7	±5% of declared value	52.0	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	±5% of declared value	47.6	Conforms

c)	Power at rated engine speed, kW (under natural ambient condition)	Non-evaluative	54.7	±5% of declared value	52.0	Conforms
d)	Specific fuel consumption corresponding to average maximum power under 2 h maximum power test, g/kWh.	Evaluative	252	+5% of declared value	262	Conforms
e)	Max. Smoke density (Bosch no.) at 80% load between the speed at max. Power & 55% of speed at max. power or 1000 rpm whichever is higher	Evaluative	As per CMV rules, Light absorption coefficient 3.25 m ⁻¹ / Hartridge units 75	Nil	1.06 m ⁻¹	Conforms
f)	Max. Crank shaft torque, (Nm) observed during the test after no load engine speed is adjusted as per manufacturer's recommendation for field work	Evaluative	340	±8% of declared value	317	Conforms
g)	Back up torque, %	Evaluative	7 % min.	Nil	37.6	Conforms
h)	Max. Operating temperature, °C i) Engine oil ii) Coolant	Evaluative	i) 120 ii) 105	Should not exceed the declared value	i) 103 ii) 85.8	Conforms
i)	Lubrication oil consumption, g/kWh	Evaluative	Not exceeding 1 % of SFC at maximum power (high ambient) (2.45)	Nil	0.145	Conforms

II. Brake performance at 20 km/h or maximum speed whichever is less

a)	Max. Stopping distance at a force equal to or less than 600 N on brake pedal (m)- (cold brake and hot brake) CMVR does not prescribe hot brake test.	Evaluative	As per requirement of CMVR, Max. 10 m	--	Cold 6.17 m	Conforms
b)	Max. Force exerted on brake pedal to achieve deceleration of 2.5 m/sec ² (N)	Evaluative	≤ 600 N	--	Cold 302 N	Conforms
c)	Effectiveness of parking brake at a force of 600 N at foot pedal or 400 N at hand lever	Evaluative	As per requirement of CMVR, Should be effective	--	Effective	Conforms

III. Mechanical vibration

a)	Operator's platform	Non evaluative	120 μm max.	Nil	297	Does not conform
b)	Steering control wheel	Non evaluative	150 μm max.	Nil	255	Does not conform
c)	Seat with driver seated	Non evaluative	120 μm max.	Nil	267	Does not conform

IV. Air cleaner oil pull over

a)	Air cleaner oil pull over in % when tested in accordance with IS 8122 part (II) 2000	Evaluative	0.20 max.	Nil	Dry type air is cleaner provided and hence test is not applicable	Not applicable
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V. Noise measurement

a)	Max. Ambient noise emitted by combine at by standers position dB (A)	Evaluative	As per CMV rules 88 dB (A) Maximum	Nil	86	Conforms
b)	Max. Noise at operator's ear level dB (A)	Evaluative	As per CMV rules 98 dB (A) Maximum	Nil	96.6	Conforms

VI. Header lifting Test							
	a)	Satisfactory completion of header lifting test	Evaluative	-	Nil	Satisfactorily completed	Conforms
VII. Discard limit							
	a)	Cylinder bore diameter, mm	Evaluative	104.15	Should not exceed the values declared by the manufacturer	104.03	Conforms
	b)	Piston diameter, mm	Evaluative	103.826	-do-	103.92	Conforms
	c)	Piston to cylinder liner clearance at skirt	Evaluative	0.17	-do-	0.10	Conforms
	d)	Ring end gap, mm i) Top compression ring ii) 2 nd compression ring iii) Oil ring	Evaluative	i) 1.2 ii) 1.2 iii) 1.2	-do-	i) 0.50 ii) 0.50 iii) 0.40	Conforms
	e)	Ring groove clearance, mm 1. Top compression ring 2. 2 nd compression ring 3. Oil ring	Evaluative	i) Tapered ii) 0.20 ii) 0.10	-do-	i) Tapered ii) 0.05 ii) 0.03	Conforms
	f)	Diametrical and axial clearance of big end bearing, mm Diametrical Axial	Evaluative	0.12 0.60	-do-	0.10 0.30	Conforms
	g)	Diametrical and axial clearance of main bearings, mm Diametrical Crank shaft end float	Evaluative	0.13 0.40	-do-	0.10 0.11	Conforms
	h)	Thickness of brake lining, mm	Evaluative	Up to rivet	-do-	8.09	Conforms
	i)	Thickness of clutch plate, mm	Evaluative	Up to rivet head	-do-	2.30 to 2.42 mm above the rivet head	Conforms

VIII. Field performance							
	a)	Suitability for crops	Evaluative	Wheat and paddy (Wheel type) Paddy (Track type)	Nil	Wheat and paddy	Conforms
	b)	Average processing losses (%)	Evaluative Wheat Rice	Max (of Average 3% Average 4%)	Nil	Wheat (max) 1.7% Paddy (max) 2.3 %	Conforms Conforms
	c)	Threshing efficiency	Evaluative	≥98 percent for wheat & Paddy	Nil	99.50 % for Wheat 99.20 % for Paddy	Conforms
	d)	Cleaning efficiency	Evaluative	≥96 percent for wheat & Paddy	Nil	97.80 % for Wheat 96.80 % for Paddy	Conforms
	e)	Grain breakage in main grain tank	Evaluative	≤ 2.5 percent	Nil	1.17 % for Wheat 1.57 % for Paddy	Conforms
	f)	Non collectable losses	Evaluative	i) ≤ 2.5 percent for wheat & Paddy & grain	Nil	0.4 % For Wheat 0.2 % For Paddy	Conforms
IX. Safety requirement							
	a)	Guards against all moving parts/drives and hot parts	Evaluative	Belt and chain drives, pulleys hydraulic pipes (Around operators work place)	--	Provided	Conforms
	b)	Lighting arrangement	Evaluative	As per CMVR	-	Provided	Conforms
	c)	Grain tank cover	Evaluative	Essential	-	Provided	Conforms
	d)	Spark arrester in engine's exhaust in case naturally aspirated engine	Evaluative	Essential	-	Provided	Conforms
	e)	Stone trap before concave bars	Evaluative	Essential	-	Provided	Conforms
	f)	Rear view mirror	Evaluative	Essential	-	Provided	Conforms

	g)	Fire extinguisher	Evaluative	Essential	-	Provided	Conforms
	h)	Slip clutch at following drives –					
		i) Cutting platform auger	Evaluative	Essential		Provided	Conforms
		ii) Undershot conveyor drive	Non evaluative	Optional	-	Provided	Conforms
		iii) Grain & tailing elevator	Non evaluative	Optional		Not provided	Does not conform
	i)	Anti slip surfaces at operator platform & ladder & proper gripping for the control levers.	Evaluative	Essential	-	Provided	Conforms
	j)	Working clearance around the controls	Non evaluative	Essential 70mm,min	-	Provided	Conforms
	k)	Labelling of control and gauges	Evaluative	Essential	-	Provided	Conforms

X	Material of construction :						
	i)	Knife guard should conform to IS: 6024 -1983	Non evaluative	Should have maximum hardness 163HB	-	217.5 (Average)	Does not conform
	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=0.26 Mn= 77	Does not conform Does not conform
	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=0.15	Does not conform

18.2 Acceptance Criteria in case of Breakdown/Defects as per clause 4.2 of IS:15806-2018

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

19. COMMENTS AND RECOMMENDATIONS**19.1 Mechanical vibration**

The amplitude of mechanical vibration of components marked as (*) in chapter 6 of this report are observed to be 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.

19.2 Field performance test

No noticeable defect observed during field test.

19.3 Ease of operation and safety provision

i) No noticeable difficulties observed during operation of combine harvester.

ii) Slip clutch at grain and tailing elevator drive are not provided.

It should be provided as per the requirement of IS:15806-2018

19.4 Hardness and chemical composition

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


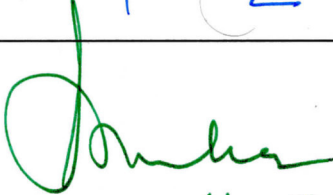
19.9 Literature supplied with the machine

The following literature was submitted by applicant during testing.

- i) Operator and service manual of combine harvester
- ii) Parts catalogue of combine harvester
- iii) HAEETI, Service manual, Ashok Leyland

However, the same needs to be updated as per IS:-8132-1999.

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 11.07.2022

The draft test report compiled by Sh. Vikram, Sh. Denny Hasnu (Senior Technician)

20. APPLICANT'S COMMENTS

No specific comments received from applicant.