

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



**BALKAR 9500, SELF PROPELLED COMBINE
HARVESTER WITH STRAW COLLECTOR**



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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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
I. Prime mover performance						
a)	Max. power (absolute) - Average max. power observed during 2 hrs. max. power test in natural ambient condition, kW	Evaluative	91.4	±5% of declared value	89.8	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	85	±5% of declared value	82.2	Conforms
c)	Power at rated engine speed, kW (under natural ambient condition)	Non evaluative	91.4	±5% of declared value	89.5	Conforms
d)	Specific fuel consumption corresponding to average maximum power under 2h maximum power test, g/kWh.	Evaluative	217	±5% of declared value	225	Conforms
e)	Max. smoke density 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. Maximum smoke density Light absorption coefficient of 5.2 units	Nil	1.75 m ⁻¹	Conforms

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	f)	Max. crank shaft torque, (N-m) observed during the test after no load engine speed is adjusted as per manufacturer's recommendation for field work	Evaluative	453.5	±8% of declared value	542.7	Conforms
	g)	Back up torque, % (Natural ambient)	Evaluative	7 % min.	Nil	16.42	Conforms
	h)	Max. operating temperature, °C i) Engine oil ii) Coolant	Evaluative	i) 106.0 ii) 105.0	Should not exceed the declared value	103.3 101.3	Conforms Conforms
	i)	Lubrication oil consumption, g/kWh	Evaluative	1 % of SFC at maximum power (high ambient)	Nil	0.272	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)	Evaluative	As per requirement of CMVR	Nil	Cold: 2.9 Hot: 2.8	Conforms
	b)	Max. force exerted on brake pedal to achieve deceleration of 2.5, m/s ² (N)	Evaluative	As per requirement of CMVR	≤600N	265	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	Nil	Effective	Conforms

III. Mechanical vibration

	a)	Operator platform	Non Evaluative	120 µm max.	Nil	264	Does not conform
	b)	Steering wheel	Non evaluative	150 µm max	Nil	269	Does not conform
	c)	Seat with driver seated	Non evaluative	120 µm max.	Nil	299	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 cleaner provided hence test is not applicable	Not applicable
V. Noise measurement							
	a)	Max. ambient noise emitted by combine at by-stander's position, dB(A)	Evaluative	88 dB(A) as per CMVR	Nil	81.5	Conforms
	b)	Max. noise at operator's ear level dB(A)	Evaluative	98 dB(A) as per CMVR	Nil	94.3	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	104.02	Conforms
	b)	Piston diameter, mm	Evaluative	103.90	-do-	103.94	Conforms
	c)	Piston to cylinder liner clearance at skirt	Evaluative	0.10	-do-	0.08	Conforms
	d)	Ring end gap, mm	Evaluative	1.20	-do-	0.40	Conforms
	i)	Top compression ring		1.20		0.50	Conforms
	ii)	2 nd compression ring		1.20		0.30	Conforms
	e)	Ring groove clearance, mm	Evaluative	--	-do-	Tapered	--
	i)	Top compression ring		0.50		0.07	Conforms
	ii)	2 nd compression ring		0.50		0.05	Conforms
	iii)	Oil ring					Conforms

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f)	Diametrical and axial clearance of big end bearing, mm Diametrical Axial	Evaluative	0.30 0.40	-do-	0.09 0.35	Conforms Conforms
g)	Diametrical and axial clearance of main bearings, mm Diametrical Axial/crank shaft end float	Evaluative	0.10 0.40	-do-	0.06 0.19	Conforms Conforms
h)	Thickness of brake lining	Evaluative	Up to rivet head	-do-	5.6 to 6.2 mm above rivet head	Conforms
i)	Thickness of clutch plate	Evaluative	Up to rivet head	-do-	2.8 to 3.0 mm above rivet head	Conforms

VIII. Field performance

a)	Suitability for crops	Evaluative	Wheat & Paddy (Wheel type)* Paddy (Track type)	Nil	Wheat	--
b)	Average processing losses, %	Evaluative	Max. (of average) 3%	Nil	Wheat Max. 2.46 %	Conforms
		Rice/ Paddy	4%			
c)	Threshing efficiency	Evaluative	≥98 percent for wheat & Paddy	Nil	Min. 99.2 % for wheat	Conforms
d)	Cleaning efficiency	Evaluative	≥96 percent for wheat & Paddy	Nil	Min. 96.8 % for wheat	Conforms
e)	Grain breakage in main grain tank	Evaluative	≤2.5 percent	Nil	1.47 % for wheat	Conforms
f)	Non collectable losses	Evaluative	≤2.5 percent for wheat & paddy & grain ≤4.0 percent for Soybean	Nil	Max. 0.66 % for wheat	Conforms

* This machine is specially designed for harvesting of wheat crop and collection of straw.

IX. Safety requirement

a)	Guards against all moving parts	Evaluative	Belt and chain drives, pulleys, hydraulic pipes	--	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	-	Turbo charger fitted engine provided	--
e)	Stone trap before concave	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 –	Evaluative Non evaluative Non evaluative	Essential Optional Optional	-	Provided Provided Provided	Conforms Conforms Conforms
	i) Cutting platform					
	ii) Undershot conveyor drive					
	iii) Grain & tailing elevator					
i)	Anti slip surface at operator platform & ladder & proper gripping for the control levers.	Evaluative	Essential	-	Provided	Conforms
j)	Working clearance around the controls	Non evaluative	Essential 70 mm, 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 163 HB	-	261.7 (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= 0.68 Mn= 0.66	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 %	-	0.24	Does not conform

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

XI. 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

19. COMMENTS AND RECOMMENDATIONS

19.1 The amplitude of mechanical vibration of components marked as (*) in chapter 4 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.

19.2 Field performance test

19.2.1 No noticeable defect observed during field test.

19.3 Ease of operation and safety provision

No noticeable difficulties observed during operation of combine harvester.

19.4 Hardness and chemical composition

19.4.1 Chemical composition of knife blade is not within the limits specified in IS: 6025-1982. It should be looked into for corrective action at regular production level.



19.4.2 Hardness of the knife guard does not conform to their relevant IS code. It should be looked into for improvement.

19.5 Literature supplied with the machine

The following literature was submitted by applicant during testing. However, the literature needs to be updated as per IS: 8132-1999.

1. Operator & Service manual of combine harvester
2. Operator manual of engine
3. Parts catalogue of combine harvester

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 16.12.2022

Test report is compiled by Sh. Deny Hasnu, Senior Technician

20. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicants Comments
20.1	19.1	We will make arrangement to reduce the mechanical vibration of the harvester in regular production.
20.2	19.4	Overall performance of the knife is satisfactory and the carbon content of knife is very near to requirement and further we will step up to match the actual content to the required in future production.

