

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: COMB-223/2641/2021
माह/Month: January, 2021

THIS TEST REPORT VALID UP TO : 31st January, 2028



**SURINDERA 930 LEOPARD,
SELF PROPELLED COMBINE HARVESTER**



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

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15. FIELD TEST

15.1 Combine harvester was operated in field for 26.78 and 33.06 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 under:-

Crop Parameters

Sl. No.	Parameters	Observations	
		Wheat	Paddy
1.	Average plant height, cm	: 100 to 106.5	89 to 157
2.	Average number of tillers/m ²	: 401 to 457	196 to 353
3.	Average length of ear head, cm	: 10.9 to 11.6	23 to 32
4.	Average straw/grain ratio	: 1.1 to 1.3	0.6 to 1.4
5.	Average moisture, %		
	- Grain	: 9.5 to 11	16.3 to 17.3
	- Straw	: 8.5 to 9.5	58.3 to 71.1

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.) (%)	Forward speed (kmph)	Area covered (ha/h)	Fuel consumption		Grain output (kg/h)	Crop throughput (t/h)
									(l/h)	(l/ha)		
1	2	3	4	5	6	7	8	9	10	11	12	13
WHEAT												
HD-3237	1.6	0.9	2.1	99.1	97.6	1.10	1.86 to 1.96	0.608 to 0.629	7.54 to 7.94	12.0 to 13.06	3901.52 to 3986.54	8.24 to 8.97
WH-1105	2.0	0.8	2.4	98.9	97.5	1.06	1.75 to 1.80	0.523 to 0.575	7.95 to 8.26	13.82 to 15.32	3553.27 to 3920.61	8.21 to 8.74
PADDY												
Basmati -1509	2.5	2.1	3.6	98.5	96.0	1.03	1.66 to 1.71	0.403 to 0.470	6.30 to 8.23	15.63 to 17.52	2732.03 to 3382.53	6.50 to 6.91
ND 359	1.9	0.7	2.2	98.8	96.2	0.72	1.70 to 1.74	0.434 to 0.460	8.02 to 8.33	17.39 to 19.19	2566.96 to 4911.33	5.62 to 7.90
Basmati -17, 18	0.9	0.6	1.4	99.4	96.9	0.33	1.74	0.465	8.40	18.05	3939.70	7.77

b)	Peg teeth of concave		
1	217.2	216.1	0.51
2	213.2	212.2	0.47
3	215.0	214.0	0.46
4	216.1	215.1	0.46
5	215.5	215.2	0.14
6	216.4	215.7	0.32
7	214.9	214.4	0.23
8	217.8	216.9	0.41

18. SUMMARY OF OBSERVATIONS

18.1 ENGINE PERFORMANCE TEST

Table-1 : ENGINE PERFORMANCE TEST (NATURAL 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 – 2 hours test					
73.8	2299	21.87	18.05	0.245	3.37
b) Power at rated engine speed: (2200 rpm)					
73.1	2199	21.87	18.04	0.247	3.34

*High idle at no load was 1650 rpm recommended for field operation.

Table-2 : 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 -					
71.6	2299	21.92	17.93	0.250	3.27
b) Power at rated engine speed (2200 rpm)					
71.2	2199	21.51	17.62	0.247	3.31



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	
		Wheat harvesting	Paddy harvesting
1.	Range of average speed of operation (kmph)	1.75 to 1.96	1.66 to 1.74
2.	Range of average area covered (ha/h)	0.523 to 0.629	0.403 to 0.470
3.	Maximum average fuel consumption:		
	- (l/h)	7.54 to 8.26	6.30 to 8.40
	- (l/ha)	12.0 to 15.32	15.63 to 19.19
4.	Range of average crop throughput (tonne/h)	8.21 to 8.97	6.50 to 7.90
5.	Average of maximum grain breakage in main grain outlet (%)	1.10	1.03
6.	Average of maximum header losses (%)	0.49	0.95
7.	Average of maximum total non-collectable losses (%)	0.9	2.1
8.	Average of maximum total collectable losses (%) (un threshed + broken from main outlet)	2.0	2.5
9.	Average of maximum total processing losses (%)	2.4	3.6
10.	Average of minimum threshing efficiency (%)	98.9	98.5
11.	Average of minimum cleaning efficiency (%)	97.5	96.0
Performance of straw chopper cum spreader			
12.	Uniformity of straw spread, CV	--	19.2
13.	Weighted mean size of chopped straw, cm	--	11.1

18.3 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 & Part II)-2007(Reaffirmed 2014)- : **Does not conform in toto**
Tractors and machinery for agriculture and forestry-
symbol for operator controls and other displays.
- (v) IS: 8133-1983 (Reaffirmed 2014)-Guidelines for : **Does not conform in toto**
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)



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 13 of this 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 observed during field test.

21.3 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 **MUST** be provided as per the requirement of IS 15806 : 2018
- iii) The first aid box is not provided on machine. It **MUST** be provided.

21.4 Discard limit of piston diameter is not specified. It **MUST** be specified.

21.5 Discard limit of thickness of brake lining is not specified. It **MUST** be specified.

21.6 Discard limit of thickness of clutch plate is not specified. It **MUST** be specified.

21.7 Grain tank cover is not provided. It **MUST** be provided as per the requirement of IS: 15806-2018.

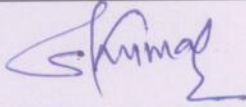
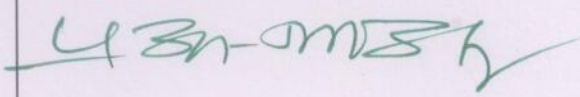
21.8 The labelling of controls gauges and all operating controls does not conform, in toto, to the requirement of the IS: 15806-218. It **MUST** be looked into for take corrective action.

21.9 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.

- 21.10 Individual brake pedals for LHS & RHS brake is not provided. It may be considered for providing.
- 21.11 Safety against the accidental start of engine is not provided on combine harvester. It should be provided.
- 21.12 Material for bushes for flail blade is not specified. It should be specified as per the requirement of IS: 15806-2018.
- 21.13 There is no drive safety for grain unloading auger. It should be provided.
- 21.14 The discard limit of clearance between engine Inlet & Exhaust valve and valve guide is not specified. It **MUST** be specified.
- 21.15 Spring stiffness of inlet and exhaust valve discard limit is not specified. It **MUST** be specified.
- 21.16 Height of reflector from does not meet the requirement of CMVR. It **MUST** be looked into.
- 21.17 Height of Slow moving vehicle emblem does not meet the requirement of CMVR. It **MUST** be looked into.
- 21.18 **Literature supplied with the machine**
The following literature was submitted by applicant during testing.
- i) Operator's manual for combine harvester
 - ii) Operator's manual for engine
 - iii) Part's catalogue for combine harvester
- The following literature should be provided.
- i) Operator's manual for SMS
 - ii) Service manual of SMS
 - iii) Part's catalogue for SMS
- However, the same need to be updated as per IS:-8132-1999

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

We will take corrective action in future production