व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: COMP-181/2420/2019
माह/Month: November, 2019

THIS TEST REPORT VALID UP TO : 31st DECEMBER, 2026

SARASWATI SUPER SMS, FITTED ON SHAKTIMAN AS-930 SELF PROPELLED COMBINE HARVESTER (COMMERCIAL)

सत्यमेव जयते

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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4. ROTOR BALANCNING TEST

	Date of test	:	21.11.2019
	Make and model of Rotor balancing machine	:	PROTEQ and H - 1 K
	Mass of the job (kg)	:	81.42
	Service speed of the job rpm	:	1810
	ISO balancing grade	:	G 16
	Balancing speed rpm	:	1810

S.No.	**Particulars**	As permissible	As observed	Remark
	Unbalance weight (Left side plane) (g)	40.44	5.34	Balanced
	Unbalance weight (Right side plane) (g)	40.44	49.64	**Unbalanced**

	Unbalance angle (**Left side plane**) (degree)	187.38
	Unbalance angle (**Right side plane**) (degree)	119.22

5. FIELD PERFORMANCE TEST

5.1 The SMS fitted on Shaktiman AS-930combine harvester was operation in the paddy field for 5.34 hrs, to assess (a) performance of SMS and, (b) performance of combine harvester with SMS.

The crop parameters recorded during the test were as under:-

Crop Parameters

Sl. No.	**Parameters**		**Observations**
1.	Average plant height, cm	:	96 to 106
2.	Average number of tillers/m^2	:	296 to 376
3.	Average length of ear head, cm	:	27 to 33
4.	Average straw/grain ratio	:	3.3
5.	Average moisture, %		
	- Grain	:	15.8
	- Straw	:	70.0

The results of field performance test of paddy crop 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 (%)	Non-collectable losses (%)	Total processing losses (%)	Threshing efficiency (%)	Cleaning efficiency (%)	Grain breakage in main grain tank (%)	Forward speed (kmph)	Area covered (ha/h)	Fuel consumption		Grain out put (kg/h)	Crop throug h-put (t/h)
									(I/h)	(I/ha)		
1	2	3	4	5	6	7	8	9	10	11	12	13
PADDY												
PR-1509	2.6	0.7	2.8	98.6	96.3	1.25	1.71	0.450	7.31	16.26	2638.34	11.43

SUMMARY OF FIELD PERFORMANCE OF SMS

Uniformity of straw spread, CV, (percent)	**20.4**
Weighted mean size of chopped strew, cm	10.1

6. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

No noticeable defect observed

7. SUMMARY OF OBSERVATIONS

7.1 Field test

7.1.1	Performance of SMS with Shaktiman AS-930 Combine Harvester	
1	Uniformity of straw spread, CV, (percent)	20.4
2	Weighted mean size of chopped strew, cm	10.1

7.1.2 Performance of Shaktiman AS-930 combine harvester with Saraswati Super SMS

S. No	Parameters	Observations
1.	Speed of operation (kmph)	1.71
2.	Area covered (ha/h)	0.450
3.	Fuel consumption: - (l/h) - (l/ha)	 7.31 16.26
4.	Crop throughput (tonne/h)	11.43
5.	Grain breakage in main grain outlet (%)	1.25
6.	Header losses (%)	0.53
7.	Total non-collectable losses (%)	0.7

8.	Total collectable losses (%) (un threshed + broken from main outlet)	2.6
9.	Total processing losses (%)	2.8
10.	Threshing efficiency (%)	98.6
11.	Cleaning efficiency (%)	96.3

8. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS AS PER IS 15806:2018

S. No	Characteristics	Category (Evaluative/ Non evaluative)	Requirement Declaration	Tolerance	Observed	Remark
1	2	3	4	5	6	7
8.1	Uniformity of straw spread, CV, (percent	Evaluative	20 Max.	--	**20.4**	**Does no conform**
8.2	Weighted mean size of chopped strew, cm	Evaluative	20 Max.	--	10.1	Conform
8.3	Processing losses in rice (%)	Evaluative	Average 4%	Nil	2.8	Conform
8.4	Threshing efficiency (%)	Evaluative	≥ 98 %	Nil	98.6	Conform
8.5	Cleaning efficiency	Evaluative	≥ 96 %	Nil	96.3	Conform
8.6	Grain Breakage in main grain tank	Evaluative	≤ 2.5 %	Nil	1.25	Conform
8.7	Non-collectable losses	Evaluative	≤ 2.5 %	Nil	0.7	Conform

	i)	Material of blades for straw management System (SMS)	Non evaluative	The flail and fixed blades shall be manufactured from steel having the following chemical composition or such other composition as shall be agreed to between the supplier and the purchaser. a) Carbon 0.70 to 1.0 percent.	--	Flail blade C-0.6179 Mn-0.4466 Cr-0.0368 Ni-0.5868 Fixed blade C-0.6359 Mn-0.4643 Cr-0.0448 Ni -0.5872	As the code itself accommodate the variation chemical composition , there is little scop for declaratio of conformit or otherwise

	vi)	Break down (critical, major & minor)			
Sr. No.	Category of breakdowns	Category (Evaluative/ Non evaluative)	Requirements as per IS 15806:2018	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

9. CRITICAL TECHNICAL SPECIFICATIONS

(Vide Ministry's communication F. No 9-1/2019- M&T (I&P) dated 20.08.2019)

Sl No.	Parameters	Specification	Observation	Remarks
Rotor				
1.	Rotor diameter, mm	165-170	170	Conforms
2.	No. of lugs on rotor in row	6	6	Conforms
3.	No. of rows in periphery	4	4	Conforms
4.	Length of pivotal flail, mm	170-180	177.8	Conforms
5.	Width of flail, mm	50 ± 1	50	Conforms
6.	Thickness of flail, mm	5.0 (Min.)	5.0	Conforms
7.	No of flails in one set	2	2	Conforms
8.	Spacing between flails of one set, mm	35 (Max)	40	**Does not conform**
9.	Distance between adjacent flails units, mm	200±10	206	Conforms
10.	No of rows/bars of serrated blades	1	1	Conforms
11.	No of serrated blades in row	20 (Min.)	24	Conforms
12.	Spacing between serrated blades, mm	50 (Max.)	50	Conforms
13.	Overlapping of pivotal blade on serrated blade, mm	60 (Min.) (adjustable)	95	Conforms
Spreader				
14.	Total no of flaps	6 + 2 (side)	6+2	Conforms
15.	Length of flaps, cm	38 (Min.)	38.5	Conforms
16.	Distance between flaps (left to right)	Adjustable	Adjustable	Conforms

17.	Spreader angle with horizontal, degree	Adjustable preferably downwards	Adjustable	Conforms
18.	Spreader angle with line of travel, degree	15 (Min.) (adjustable)	22 Max	Conforms
19.	Spreader sheet thickness, mm	2.5-3.0	3.0	Conforms
20.	SMS sheet thickness, mm	5.0 (Min.) for outer	5.0	Conforms
21.	Rotor balancing	Should be dynamically balanced	**Unbalanced**	**Does not conform**
22.	Rotor rpm	Min. 1600	1810	Conforms
23.	Fitting of SMS on combine harvester	Rigidly fixed to the combine chassis	Rigidly fixed	Conforms
24.	Fitting of power transmission system on combine harvester	Rigidly fixed to the combine chassis	Rigidly fixed	Conforms
25.	Marking/labelling of machine	Labelling plate should be riveted on the body of machine having Name and address of manufacturer, Country of origin Make Model Year of manufacturer, Serial number, Type Size required size of prime mover (kW), Weight of the machine (Kgs)	Provided	Conforms
26.	Literature	Operator manual, Service manual and Parts catalogue should be provided	Provided, but only for name sake	Conforms

10. COMMENTS AND RECOMMENDATIONS

10.1 **Uniformity of straw spread, Coefficient of Variation, (percent)** of Straw management system (SMS) **does not meet the requirement** of Indian standard. IS 15806-2018. Since it is "Evaluative" parameter, **it must be looked into.**

10.2 Rotor of SMS is not properly balanced. **This is Critical parameter, and therefore it must be looked into.**

10.3 Spreader angle with line of travel **does not meet the requirement of critical technical specification. It should be looked into.**

10.4 Spacing between flails of one set **does not meet the requirement of critical technical specification. It must be looked into.**

10.4 Applicant has recommended Shaktiman AS-930 combine harvester for SMS field testing. This is vital information and therefore the same must be inscribed in labelling plate also for the guidance of users.

10.5 In the labelling plate manufacture has declared the weight of SMS as 270 kg, which is misleading. The actual weight was observed as 225 kg. It may be looked into.

10.6 **Ease of operation and safety provision**

No noticeable difficulties observed during operation of combine harvester.

10.7 **Literature supplied with the machine**

1) There was one document entitle "Operator manual and Service manual cum Parts catalogue" was supplied. However, it could be anything but the operator manual, as it lacks the relevant information on operation, adjustments and maintenance etc. Therefore the Operator manual/ Service manual/ Parts catalogue need to be brought out as per IS 8132: 1999.

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
P. K. PANDEY **DIRECTOR**	

Test report compiled by C.Veeranjaneyulu, Senior Technician

11. APPLICANT'S COMMENTS

We strictly meet all norms as per IS at production level.